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TOWNSEND and TOWNSEND and CREW LLP

By: /Nina L. McNeill/
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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:

LAWRENCE W. STARK et al.

Application No.: 10/006,992

Filed: December 6, 2001

For: DIRECT WAVEFRONT-BASED
CORNEAL ABLATION TREATMENT
PROGRAM

Confirmation No. 1090

Examiner: Shay, David M.

Technology Center/Art Unit: 3735

APPELLANTS' AMENDED BRIEF
UNDER 37 CFR §41.37

Mail Stop Appeal Brief
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Further to the Notification of Non-Compliant Appeal Brief mailed March 27, 2008, and supplemental to the Appeal Brief filed October 27, 2006 and the Reply Brief filed April 9, 2007, Appellants submit this Amended Appeal Brief.

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1. REAL PARTY IN INTEREST

This application was initially assigned to VISX Incorporated. On December 31, 2007, a Certificate of Conversion was filed with the Delaware Secretary which changed the name of VISX Incorporated to AMO Manufacturing USA, LLC. Hence, the real party in interest is AMO Manufacturing USA, LLC, the assignee of record.

2. RELATED APPEALS AND INTERFERENCES

None

3. STATUS OF CLAIMS

Claims 1-17 and 21-35 are canceled. Claims 18-20 and 36-42 are pending, and stand rejected. Claims 43 and 44 are withdrawn. Claims 18-20 and 36-42 are appealed. All pending claims are presented in **Appendix A**.

4. STATUS OF AMENDMENTS

This Amended Appeal Brief is filed to address alleged noncompliance of the Second Appeal Brief, which was filed in response to a nonfinal Office Action. Thus, there are no Amendments After Final.

5. SUMMARY OF CLAIMED SUBJECT MATTER

The claimed subject matter involved in this appeal is directed to a method of determining an accuracy of a gradient array in an optical tissue measurement.

The method of presently pending **claim 18**, which is the sole independent claim, includes transmitting an image through the optical tissue, determining local gradients of the array across the optical tissue from the transmitted image, integrating along a closed integration path across a portion of the array, and determining the accuracy of the gradient array based on the integration. These elements are discussed in the application at, for example, page 9, line 15 to page 13, line 4, and in Figures 3 to 5.

The method of presently pending dependent **claim 39**, which is separately argued in the Reply Brief filed April 9, 2007, involves performing the integration so as to map an

error-correcting change in optical tissues, as described in intervening dependent claim 38 from which claim 39 depends. These elements are discussed in the application at, for example, page 2, line 30 to page 3, line 2; page 4, lines 1-7; page 12, lines 12-22; the Abstract; and Fig. 3. Claim 39 indicates that the mapping step includes deriving a proposed change in the optical tissue surface elevations so as to effect a desired change in optical properties of the eye, and further includes modifying the optical tissue surface according to the proposed change by laser ablation. These elements are discussed in the application at, for example, page 12, lines 12-22; and Fig. 3 at reference characters 84, 86, 90, 92, and 94.

It is noted, however, that this separate description for claim 39 is not required by 37 CFR 41.37(c)(1)(v) as discussed in the “Remarks” section below.

6. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

A. Whether claims 18-20 and 36-42 are directed to non-statutory subject matter under 35 U.S.C. §101.

B. Whether claims 18-20 and 36-42 are obvious under 35 U.S.C. §103(a) over U.S. Patent No. 6,563,105 to Seibel et al. [“Seibel”] in combination with U.S. Patent No. 6,280,435 to Odrich et al. [“Odrich”] and U.S. Patent No. 6,486,943 to Burns et al. [“Burns”].

7. ARGUMENT

As noted in the “Remarks” section below, the Argument section of the October 27, 2006 Appeal Brief is reproduced verbatim below, with the recognition that supplemental argument is provided in the April 9, 2007 Reply Brief.

A. Rejection under 35 U.S.C. §101

Claims 18-20 and 36-42

The only grounds of rejection apply to a group of claims (18-20 and 36-42), and the claims are argued as a group.

1. The Examiner's rationale

The Examiner's position is stated in the Office Action of June 15, 2006 (see page 3). In particular, the Examiner alleges that the presently pending claims are drawn to non-statutory subject matter because:

“The claimed invention is merely a calculation and thus falls within the realm of a mental process.”

2. Applicable Law

The law regarding non-statutory subject matter is discussed in *In re Musgrave* (copy enclosed), and further guidance can be found in The Interim Guidelines For Examination Of Patent Applications For Patent Subject Matter Eligibility (excerpt enclosed).

a. In re Musgrave (167 USPQ 280, Fed. Cir. 1970)

This case recites the rule that it is improper to reject a claim as directed to a non-statutory process merely because some or all the steps therein can also be carried out in or with the aid of the human mind. At issue was whether the claims directed to establishing weathering corrections in seismic exploration were properly rejected as non-statutory on the basis that they involved mental steps. The Court found that it was improper to reject the claims merely because some or all of the method steps involved processes of the human mind.

b. Interim Guidelines for Subject Matter Eligibility (OG Notices: 22 November 2005)

The Interim Guidelines caution that “USPTO personnel *should no longer rely on the mental step test* to determine whether a claimed invention is directed to statutory subject matter.” (Emphasis added; see pp. 46-47, enclosed).

3. Analysis

The foregoing court decision and Interim Guidelines clearly establish that it is improper to rely solely upon a “mental steps” test to support a non-statutory subject matter rejection under 35 U.S.C. §101.

Regardless, transmitting an image through optical tissue and determining local gradients of a gradient array based on the transmitted image, as described in pending independent claim 18, goes beyond a mental step. What is more, Appellants submit that the currently claimed methods produce useful, concrete, and tangible results, and therefore present statutory subject matter. As noted in the instant specification at, for example, page 3, lines 18-20, page 5, lines 16-18, and page 14, lines 11-15, it is possible to determine an accuracy of gradients in a gradient array which is useful in detecting bad Hartmann-Shack data along an integration path.

4. Conclusion

It has not been shown that the presently pending claims present non-statutory subject matter. Thus, the Examiner has not met the burden of establishing a *prima facie* case of unpatentability. Reversal of this outstanding rejection is respectfully requested.

**B. Rejection under 35 U.S.C. §103 over Seibel in combination with Odrich and Burns
Claims 18-20 and 36-42**

The only grounds of rejection apply to a group of claims (18-20 and 36-42), and the claims are argued as a group.

1. The Examiner's rationale

The Office Action of June 15, 2006 provides no additional rationale or guidance to support the §103 rejection over what was previously of record. Thus, Appellants reiterate the content of the first Appeal Brief. The Examiner's position is stated in the Office Action of March 29, 2005, and elaborated in the Final Office Action of August 24, 2005 and the Advisory Action of December 23, 2005. In particular, the Examiner alleges that presently pending independent claim 18 is unpatentable because:

“It would have been obvious to employ the refractometer of Burns in the method of Odrich et al and to produce the contour data by the close integration path of Seibel et al, since Odrich et al discusses no method to produce the contour data required for the method, thus producing a method such as claimed.” (See page 2 of the March 29, 2005 Office Action, and page 3 of the August 24, 2005 Final Office Action).

2. Applicable Law

The law regarding obviousness is discussed in certain decisions (copies enclosed) and also in MPEP §§ 2142, 2143, and 2112 as set forth below.

a. Application of Royka (490 F.2d 981, 180 USPQ 580)

This case recites the rule that a *prima facie* case of obviousness must show that the cited references, when combined, teach or suggest all of the claimed elements. At issue was whether any of the cited references disclosed use of a xerographic toner, which was recited in the claims. The court found none of the references described xerographic technology, and therefore the obviousness rejection was improper.

b. In re Vaeck (947 F.2d 488, 20 U.S.P.Q. 2d 1438)

This case reiterates that a *prima facie* case of obviousness requires that the cited references must provide a teaching or suggestion to make the claimed combination. At issue was whether the art worker would have been motivated to combine *Bacillus* DNA, which was discussed in one reference, with Cyanobacteria DNA, which was discussed in another reference. The court ruled that the cited references provided no motivation to make the proposed combination, and therefore the *prima facie* obviousness was improper.

c. Mehl/Biophile International Corp. v. Milgraum (192 F.3d 1362, 52 U.S.P.Q. 2d 1303)

This case reinforces the principle that inherency requires the alleged feature to naturally flow from the cited reference. At issue was whether a claimed laser treatment element was inherently described in either (a) a manual for tattoo removal or (b) a journal article describing guinea pig epilation. The court ruled that the claim element of aligning a laser light applicator over a hair follicle opening was not inherently disclosed in the tattoo removal manual, because a tattoo location may or may not contain a hair follicle. On the other hand, the court found that the claim element was inherently disclosed in the guinea pig article, because laser treatment of a guinea pig necessarily involves alignment of a laser over a hair follicle, due to the prevalence of hair follicles on the treated area.

d. In re Dembiczak (175 F.3d 994, 50 U.S.P.Q. 2d 1614)

The rule regarding impermissible hindsight is further illustrated by this case. The issue was whether a patent claim for a trash bag decorated to resemble a pumpkin was properly rejected on grounds of obviousness. The court found that a *prima facie* case of obviousness had not been established because the rejection was based on a reference-by-reference, limitation-by-limitation analysis. There was no teaching or suggestion to combine children's art references with conventional trash or lawn bag references.

e. MPEP § 2143 Requirements of a *Prima Facie* Case of Obviousness

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, not in applicant's disclosure."

f. MPEP § 2112 (IV) Inherency

This section of the MPEP provides the following guidance regarding inherency: The fact that a certain result or characteristic may occur or be present in the prior art is not sufficient to establish the inherency of that result or characteristic. [. . .] To establish inherency, the extrinsic evidence must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill. [. . .] In relying upon the theory of inherency, the examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the applied prior art.

g. MPEP § 2142 Legal Concept of *Prima Facie* Obviousness

To reach a proper determination under 35 U.S.C. 103, the examiner must step backward in time and into the shoes worn by the hypothetical "person of ordinary skill in the art" when the invention was unknown and just before it was made. In view of all factual information, the examiner must then make a determination whether the claimed invention "as a whole" would have been obvious at that time to that person. Knowledge of applicant's disclosure must be put aside in reaching

this determination, yet kept in mind in order to determine the “differences,” conduct the search and evaluate the “subject matter as a whole” of the invention. The tendency to resort to “hindsight” based upon applicant’s disclosure is often difficult to avoid due to the very nature of the examination process. However, impermissible hindsight must be avoided and the legal conclusion must be reached on the basis of the facts gleaned from the prior art.

3. Analysis

The foregoing court decisions and MPEP provisions clearly establish that the cited references, when combined, must expressly or implicitly teach all the claim limitations, and that there must be some motivation to combine the references that is not based on hindsight.

a. Claim Elements Not Taught by References

Presently pending independent claim 18 is drawn to a method for determining an accuracy of a gradient array in an optical tissue. The method includes the steps of *i*) transmitting an image through the optical tissue, *ii*) determining local gradients of the array from the transmitted image, *iii*) integrating along a closed integration path across a portion of the array, and *iv*) determining the accuracy of the gradient array based on the integration.

Advantageously, as noted in the specification at page 12, line 27 to page 14, line 21, by performing an integration it is possible to detect and identify inaccuracies in the gradient array. Relatedly, as noted in the specification at, for example, page 14, lines 11-15, embodiments of the present invention provide for the capability of detecting bad Hartmann-Shack data along a path by an integration technique.

1) U.S. Patent No. 6,563,105 to Seibel et al.

In general, Seibel describes ultrathin fiber optic endoscopy, wherein an object is illuminated with a fiber, and data associated with reflected light is integrated to provide surface information. More specifically, Seibel reports image acquisition devices that can selectively illuminate a target by vibrating an optical fiber. [Seibel, Fig. 1; col. 1, lines 17-23; col. 4, lines 14-25] Seibel’s devices seek to characterize the target surface based on signals reflected from

the target surface and detected near the vibrating fiber. [*Id.*] Seibel describes integration of orientation values derived from those reflected signal along arbitrary curves or closed paths, but acknowledges that the noisy signals received by that system may require that, in practice, the use of optimization techniques or the like may have to be employed in order to recover smooth surfaces. [*Id.* at col. 17, lines 31-36]

Seibel does not teach i) transmitting an image through optical tissue, ii) determining local gradients from an image that has been transmitted through optical tissues, iii) integration across a gradient field based on image transmitted through tissues, nor iv) determining an accuracy of any gradient array based on an integration. As far as Appellants understand the applicability of this reference, it is cited for the proposition that integration along a closed path is known. Appellants note, however, that the Seibel reference integrates only imaging data reflected from a surface to attempt to recover surface depth information, and that such a disclosure appears largely (if not completely) irrelevant to the presently claimed invention.

In an apparent inherency argument (see August 24, 2005 Office Action at page 2, lines 9-11; and December 23, 2005 Advisory Action at page 2, lines 3-4), the Examiner seems to allege that determining the accuracy of the gradient array is a necessary consequence of Seibel's integration. Applicants disagree, and note that the record is devoid of any established support whatsoever for any assertion that Siebel would inherently or implicitly make use of any one of the method steps recited by claim 18. To satisfy the requirements regarding inherency as discussed in *Mehl/Biophile* and MPEP §2112 (IV), the Examiner would have to establish that the accuracy determination must flow as a natural consequence from the technological constraints of Seibel. Applicants submit that Seibel sustains no such finding. In fact, contrary to the Examiner's inherency argument, it is entirely possible to perform an integration without determining the accuracy of the array. The optimization actually suggested by Siebel can proceed without any asserted need for such an array accuracy determination.

As a reference directed to surface depth data, Seibel is reminiscent of U.S. Patent No. 6,011,625 to Glass, which was cited in a previous Office Action dated March 10, 2004 and subsequently withdrawn as a reference. Glass similarly discusses an integration approach for characterizing surface information (e.g. terrain heights). Applicants submit that Seibel's surface

characterization is no more relevant to the presently claimed invention than was Glass's surface characterization, and that the rejections relying on this reference should also be withdrawn.

2) U.S. Patent No. 6,280,435 to Odrich et al.

Odrich is cited for the proposition that spatially resolved refractometers can be used to map the surface contour of the cornea. However Odrich has not been shown to teach or disclose determining the accuracy of a gradient array based on any integration, much less the detailed method steps presently recited in claim 18.

3) U.S. Patent No. 6,486,943 to Burns et al.

Burns is cited for the proposition that spatially resolved refractometers that transmit images through the cornea are known. Yet Burns has again not been shown to teach or disclose determining the accuracy of a gradient array based on any integration, as presently claimed.

In sum, Seibel fails to teach or suggest the step of determining the accuracy of a gradient array based on the integration, and Odrich and Burns fail to remedy this deficiency. Thus, the combination of elements does not teach all of the presently claimed elements, and therefore cannot support a *prima facie* obviousness rejection, as set out in *Application of Royka* and MPEP §2143.

b. Motivation to Combine References Not Established

As noted above, the Examiner alleges that:

“It would have been obvious to employ the refractometer of Burns in the method of Odrich et al and to produce the contour data by the close integration path of Seibel et al, since Odrich et al discusses no method to produce the contour data required for the method, thus producing a method such as claimed.”

As Applicants understand the Examiner's argument, the Examiner asserts that Odrich describes a surface refractometer for mapping corneal surface contours, but does not describe a method to produce the resulting contour data. The Examiner alleges the artisan would be motivated to use Seibel's surface endoscopy integration method therefore to produce such

surface contour data, but instead of using the Odrich corneal surface refractometer, the artisan would allegedly be motivated to use the subsurface refractometer of Burns.

The Examiner does not state, however, why the artisan would be motivated in the first place to use the subsurface refractometer of Burns instead of the surface refractometer of Odrich. What is more, the Examiner does not explain why the artisan would be motivated to pick and choose different parts of the Burns reference, the Odrich reference, and the Seibel reference to provide an accuracy determination that is absent from all of these references. As an example of why the present rejections fail to set forth a reasonable basis for *prima facie* obviousness, Applicants understand the Examiner to assert that the artisan would allegedly be motivated to use the subsurface refractometer of Burns, but would disregard the various corresponding subsurface optical tissue analysis methods described by Burns (e.g. col. 9, line 37 to col. 16, line 6) and instead use the surface analysis methods described by Seibel. Yet the Examiner provides no explanation for the substitution, and absent a reasonable motivation for altering the actual disclosure of the references themselves or combining the references as discussed in *In re Vaeck* and MPEP §2143, the rejection must be withdrawn.

c. Hindsight Reasoning is Impermissible

As noted in MPEP §2142 and *In re Dembiczak*, it is improper to rely upon hindsight to support a finding of obviousness. It is respectfully submitted that the Examiner's proposed scheme of reasoning requires considerable mental gymnastics in selectively picking and choosing between elements of three separate references, and prodigious imagination in leaping gaps between the very different systems described in those references. Such a scheme is much easier to construct in hindsight with knowledge of the presently claimed invention than it would be prospectively. It is in precisely such circumstances that the requirement for evidence of particularized motivation is most acute as a safeguard against hindsight. However, the motivation relied on here is neither particularized to the presently claimed invention nor supported by an evidentiary source. In the absence of such a safeguard, the case of obviousness appears to be the result of the Examiner stitching together bits and pieces of the cited references

using the Applicant's disclosure as a blueprint, and thus constitutes impermissible hindsight. The suggestion or motivation to combine references must not come from the Applicant.

As noted in MPEP 2143.03, if an independent claim is nonobvious, then the claims depending therefrom are nonobvious as well. Therefore, claims 19, 20, and 36-42 depend either directly or indirectly, and therefore are allowable as depending from an allowable base claim, as well as for the nonobvious combination of elements they recite.

4. Conclusion

It has not been shown that the cited references when combined teach all the claim elements, nor has any motivation to combine the references been established that is not based on hindsight. Thus, the Examiner has not met the burden of establishing a *prima facie* case of obviousness. Reversal of this outstanding rejection is respectfully requested.

8. CLAIMS APPENDIX

A copy of the claims involved in the appeal is attached as Appendix A.

9. EVIDENCE APPENDICES

None

10. RELATED PROCEEDINGS APPENDIX

None

11. TABLE OF MATERIALS

Copies the decisions and other items discussed above (and listed in the Table of Materials below) are attached as **Appendices B-G**.

Table of Materials	
Appendix B	In re Musgrave
Appendix C	Interim Guidelines (pp. 46-47)
Appendix D	Application of Royka
Appendix E	In re Vaeck
Appendix F	Mehl/Biophile International Corp. v. Milgraum
Appendix G	In re Dembiczak

12. REMARKS

The instant Amended Appeal Brief is filed pursuant to MPEP 1205.03 to address the Notice of Non-Compliant Appeal Brief. Specifically, this Amended Appeal Brief addresses the Evidence Appendix and the Disclosure Mapping requests contained in the Notice.

A. Evidence Appendix

The Notification of Non-Compliant Appeal Brief dated March 25, 2008 alleges that the Appeal Brief filed October 27, 2006 did not meet the requirements of 37 CFR 41.37(c)(1)(ix) with regard to the Evidence Appendix. This Amended Appeal Brief does not include an Evidence Appendix, and therefore complies with 37 CFR 41.37(c)(1)(ix).

The materials listed in the “Evidence Appendix” section of the October 27, 2006 Appeal Brief are now presented in the “Table of Materials” section of this Amended Appeal Brief. Such Tables are expressly permitted under MPEP 1205.02.

B. Disclosure Mapping

The requested disclosure mapping for claim 39 is provided in the "Summary Of Claimed Subject Matter" section above. However, Appellants submit that the Notification was improper in making this request for identification. More specifically, the Notification of Non-Compliant Appeal Brief dated March 25, 2008 alleges that the Appeal Brief filed October 27, 2006 did not meet the requirements of 37 CFR 41.37(c)(1)(v) with regard to claim 39. Appellants disagree.

The Notification alleges that claim 39 includes a step plus function recitation and therefore invokes the requirements of 37 CFR 41.37(c)(1)(v). Yet, the Notification provides no hint or suggestion as to what specific element of claim 39 corresponds to the alleged step plus function.

MPEP 2181(I) explains how to identify a §112 sixth paragraph limitation. The claim must meet a three-prong analysis which requires, among other things, that the claim element must use the phrase "means for" or "step for." A claim element that does not include the phrase "means for" or "step for" will not be considered to invoke §112, sixth paragraph.

Because dependent claim 39 has not been shown to recite a step plus function, it is improper to conclude that claim 39 invokes §112, sixth paragraph. Thus, it is inappropriate to require a disclosure mapping under 37 CFR 41.37(c)(1)(v), and the Notification errs in making this request.

C. No Substantive Issues Presented

As noted above, the Argument section of the October 27, 2006 Appeal Brief is reproduced verbatim herein, with the acknowledgement that supplemental argument is provided in the April 9, 2007 Reply Brief.

The request regarding the Evidence Appendix is clerical in nature and presents no matters of substance. Moreover, the Notification request for disclosure mapping is incorrect. Appellants submit that this Amended Appeal Brief presents no new substantive matters that go beyond the previously filed Appeal and Reply Briefs.

KSR v. Teleflex

As noted above, the previous Appeal Brief was filed October 27, 2006, and the Reply Brief was filed April 9, 2007. On April 30, 2007, the U.S. Supreme Court issued a decision (KSR v. Teleflex) pertaining to the issue of obviousness. In the present application, the single §103 rejection is based on the proposed combination of Seibel, Odrich, and Burns. As noted in the Reply Brief, however, Seibel and Odrich are not available due to filing date and common ownership issues. Hence, although there may have been an update in the law of obviousness prior to the filing of this Amended Appeal Brief, the record in this application firmly establishes that any change brought about by the KSR decision would have no impact on the outcome of this Appeal.

Respectfully submitted,

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8. CLAIMS - APPENDIX A

1-17. (Canceled)

18. (Previously Presented) A method of determining an accuracy of a gradient array in an optical tissue measurement comprising:

transmitting an image through the optical tissue;

determining local gradients of the array across the optical tissue from the transmitted image;

integrating along a closed integration path across a portion of the array; and

determining the accuracy of the gradient array based on the integration.

19. (Original) The method of claim 18, further comprising:

calculating a change in elevation along the closed integration path across the portion of the array.

20. (Original) The method of claim 18 wherein, the closed integration path comprises:

a common starting point, a common ending point, a first integration path connecting the common starting point to the common ending point, and a second integration path connecting the common starting point to the common ending point, the first and second integration paths being different.

21-35. (Canceled)

36. (Previously Presented) The method of claim 18, further comprising transmitting a source image from a light source posteriorly through the optical tissues and onto the retina to define the image, wherein the image is transmitted posteriorly through a central region of the cornea, the central region having a size which is significantly less than a pupil size of the eye, and wherein the image is transmitted from the retina anteriorly through the optical tissues.

37. (Previously Presented) The method of claim 36, wherein the image is transmitted by the optical tissues as a plurality of beamlets, wherein each gradient corresponds to an associated portion of an optical surface such that each beamlet is transmitted through the optical tissue according to the corresponding gradient.

38. (Previously Presented) The method of claim 18 wherein the integration is performed so as to map an error-correcting change in optical tissues.

39. (Previously Presented) The method of claim 38 wherein the mapping step comprises deriving a proposed change in the optical tissue surface elevations so as to effect a desired change in optical properties of the eye, and further comprising modifying the optical tissue surface according to the proposed change by laser ablation.

40. (Previously Presented) The method of claim 18, wherein the closed integration path extends from a first center of a first portion of the optical surface to a second center of a second portion of the optical surface, from the second center to a third center of a third portion of the optical surface, and from the third center back to the first center, the first, second and third portions of the optical surface corresponding to the first, second and third gradients of the gradient array, respectively.

41. (Previously Presented) The method of claim 18, wherein the closed integration path extends from an initial location corresponding to a position between a first gradient array element and a second gradient array element, the path crossing a first portion of the optical surface corresponding to the second gradient array element, a second portion of the optical surface corresponding to a third gradient array element, and a third portion of the optical surface corresponding to a fourth gradient array element before returning back to the initial location.

42. (Previously Presented) The method of claim 18, wherein an elevation map is generated directly in the mapping step without deriving coefficients of a series expansion mathematically approximating the optical surface.

43. (Withdrawn) A method of identifying an inaccuracy of a gradient array corresponding to an optical tissue, comprising:

inputting a gradient array corresponding to light transmitted through an optical tissue;

integrating along a first closed integration path on the gradient array to determine a first path integration, the first integration path comprising a common starting point and a common ending point;

integrating along a second closed integration path on the gradient array to determine a second path integration, the second path comprising the common starting point and the common ending point; and

identifying the inaccuracy of the gradient array by comparing the first path integration with the second path integration.

44. (Withdrawn) A method of identifying an inaccuracy of a gradient array corresponding to an optical tissue, comprising:

inputting a gradient array corresponding to light transmitted through the optical tissue;

integrating along a first closed integration path on the gradient array to determine a first path integration, the first integration path comprising a common starting point and a common ending point;

integrating along each of a set of additional closed integration paths on the gradient array to determine a corresponding set of additional path integrations, each of the additional closed integration paths comprising the common starting point and the common ending point; and

identifying the inaccuracy of the gradient array by comparing the first path integration with the set of additional path integrations.

APPENDIX B
IN RE MUSGRAVE

Source: USPQ, 1st Series (1929 - 1986) > U.S. Court of Appeals, Federal Circuit > In re Musgrave, 167 USPQ 280 (Fed. Cir. 1970)

In re Musgrave, 167 USPQ 280 (Fed. Cir. 1970)

167 USPQ 280

In re Musgrave

U.S. Court of Customs and Patent Appeals

No. 8292

Decided October 8, 1970

431 F2d 882

Headnotes

PATENTS

[1] Patentability - Subject matter for patent monopoly - Mental processes (► 51.609)

Patentability - Subject matter for patent monopoly-Process, product and apparatus (► 51.613)

It is illogical to contend that a process containing both physical and mental steps constitutes statutory subject matter if alleged novelty or advance in the art resides in physical steps but nonstatutory if it resides in steps deemed to be mental; novelty and advancement of an art are irrelevant to determination of whether nature of a process is such that it is encompassed by meaning of "process" in 35 U.S.C. 101.

[2] Patentability - Subject matter for patent monopoly - Mental processes (► 51.609)

Words and phrases(►70.)

"Mental" is a vague term of indefinite meaning; whether step is "mental" or "purely mental" is question to be determined on case-by-case basis, considering all of the surrounding circumstances.

[3] Patentability - Subject matter for patent monopoly - Mental processes (► 51.609)

Patentability - Subject matter for patent monopoly - Process, product and apparatus (► 51.613)

Law does not require that all steps of statutory "process" be physical acts applied to physical things; it is a misconstruction to assume that all processes, to be patentable, must operate physically upon substances.

[4] Patentability - Subject matter for patent monopoly - Process, product and apparatus (► 51.613)

In considering patentability of process consisting of a plurality of steps, it is immaterial to question whether combination is a statutory "process" that individual steps are old; whole process could be old and yet be statutory; a fortiori, it matters not that one or more steps are old.

[5] Claims - Indefinite - In general (► 20.551)

Patentability - Subject matter for patent monopoly - Mental processes (► 51.609)

Patentability - Subject matter for patent monopoly - Process, product and apparatus (► 51.613)

Where all steps of process claims can be carried out by disclosed apparatus, claims are not directed to nonstatutory processes merely because some or all steps therein can be carried out in or with aid of

human mind or because it may be necessary for one performing the processes to think; all that is necessary to make a sequence of operational steps a statutory "process" within 35 U.S.C. 101 is that it be in the technological arts so as to be in consonance with Constitutional purpose to promote progress of "useful arts"; of course, to obtain a valid patent, claim must also comply with all other provisions of statute, including definiteness under section 112; step requiring exercise of subjective judgment without restriction might be objectionable as rendering claim indefinite, but this would provide no statutory basis for rejection under section 101.

Particular Patents

Particular patents-Seismogram

Musgrave, Corrections for Seismic Data Obtained from Expanding-Spread, claims 1 to 14, 17 to 39, 47 to 58, and 60 of application allowed.

Case History and Disposition

Appeal from Board of Appeals of the Patent Office.

Application for patent of Albert W. Musgrave, Serial No. 496,735, filed Sept. 30, 1965; Patent Office Group 220. From decision rejecting claims 1 to 14, 17 to 39, 47 to 58, and 60, applicant appeals. Reversed; Baldwin, Judge, concurring with opinion.

Attorneys

Virgil E. Woodcock and Woodcock, Phelan & Washburn, both of Philadelphia, Pa. (James H. Littlepage, Washington, D. C., Sidney A. Johnson, New York, N. Y., William J. Scherback, Dallas, Tex., and Richard E. Kurtz, Philadelphia, Pa., of counsel) for appellant.

S. Wm. Cochran (Jere W. Sears of counsel) for Commissioner of Patents.

Judge

Before Rich, Almond, Baldwin, and Lane, Associate Judges, and Rosenstein,

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Judge, United States Customs Court, sitting by designation.

Opinion Text

Opinion By:

Rich, Judge.

This appeal is from the decision of the Patent Office Board of Appeals ¹affirming the rejection of claims 1-14, 17-39, 47-58 and 60 of application serial No. 496,735, filed September 30, 1965, and entitled "Corrections for Seismic Data Obtained from Expanding-Spread." Six apparatus claims have been allowed. We reverse.

¹ Consisting of Kreek, Keely, and Andrews, Examiners-in-Chief, opinion by Andrews.

The Invention

The principal object of appellant's invention is to obtain seismograms which delineate with a high degree of precision the nature of the subsurface formations in the earth's crust.

Background

Appellant's brief states:

A seismogram is a record of earth vibrations. In a reflection seismic survey, dynamite is detonated at a shotpoint, as in a shallow borehole, for the generation of seismic energy. A part of the downwardly traveling energy is reflected upwardly at each subsurface interface. A reflecting interface is a region where there is a change in the velocity [of the seismic energy] as between adjoining layers of the earth, such as a layer of rock (high velocity) and a layer of sand (low velocity). In addition to change in velocity of the seismic energy in the earth due to the velocity characteristics of layers, the velocity through the earth increases with depth.

At the earth's surface, the upwardly reflected energy is detected by a plurality of seismic detectors or geophones. These extend linearly along a line of exploration. After each explosion of dynamite [along the line of exploration], each detector over a period of several seconds generates a plurality of electrical signals representative, inter alia, of reflected energy, multiples, and noise due to random earth movements unrelated to the effect of the reflected seismic energy. [Bracketed insertions ours.]

A seismogram is produced by recording, on a magnetic tape for example, the electrical signals generated by each detector. Ordinarily, a "family" of seismograms is produced for each dynamite blast-there being one seismogram for each detector. A plurality of dynamite blasts along a line of exploration will therefore yield a plurality of families of seismograms.

Appellant refers to two ways in which the detectors may be arranged with respect to the shotpoints along the line of exploration, one being referred to as a "split-spread" and the other as an "expanded-spread." In a split-spread, the shotpoint is located in the center of a spread of detectors. In an expanded-spread the shotpoint is located on the line of exploration but at some distance from the spread of detectors. It is unnecessary for an understanding of this opinion to be aware of further details of these arrangements. It will suffice to note that appellant uses both arrangements simultaneously to produce two families of seismograms for each dynamite blast.

To render meaningful the seismogram produced as described above, it is necessary to apply to it a so-called "weathered-layer correction" and a so-called "normal move-out correction." With respect to the former, appellant explains that at the earth's surface there is an unconsolidated, weathered layer (commonly called "soil") of variable depth and inclination. The velocity of seismic energy passing through this layer is much lower than in the consolidated layer just beneath it. Since the weathered layer is of variable thickness and of low velocity, it is necessary to subtract the travel time of the seismic energy in the weathered layer from the total travel time.

Because of the high velocity contrast which exists between the base of the weathered layer and the adjoining consolidated layer, some of the seismic energy produced at the shotpoint will travel downward to the interface of the weathered and consolidated layers and be reflected upward to the detectors. The time-occurrence of the first reflection on the seismogram (time-zero being the instant the dynamite is detonated) provides the time-correction needed to eliminate the effect of the weathered layer on the time or depth measurements of interest.

A normal move-out correction is necessary to compensate for the geometrical spreading of the detectors. Since the measurements of interest are *depths* below the earth's surface, the identification of reflections in terms of *vertical* travel time is desired. Obviously, the travel path, and therefore travel time, from a

shotpoint to a given reflecting interface or "horizon" and then to a given detector is greater for a detector located some distance from the shotpoint than for a detector directly adjacent the shotpoint. In correcting a family of seismograms for normal move-out, however, it must also be taken

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into account that the effect of geometrical spreading of the detectors decreases with increases in the depth from which a given seismic wave is reflected. Therefore, normal move-out corrections must be "dynamic"; that is, the magnitude of each correction for each detector must be varied inversely with the depth from which a wave is reflected-the greater the depth the less the correction. Stated differently, the longer the time-occurrence of a given wave is from time-zero on a seismogram, the less it is *corrected* for normal move-out.

Correction of a family of seismograms for the weathered-layer and normal move-out yields, in effect, a new family of seismograms on which the positions of the representations of seismic waves relative to one another more nearly correspond to the relative depths of the horizons from which those waves were reflected. Perfect corrections would cause all the reflection signals corresponding to a given horizon to be lined up across the set of seismograms. However, since the corrections are ordinarily somewhat imperfect, further adjustments are made by reproducing the seismograms as traces on an oscilloscope and manipulating knobs on the oscilloscope to bring the reflections into horizontal alignment.

Refinement of this "new" seismogram is accomplished by identification and elimination of "multiples." Multiples represent unwanted signals which must be eliminated to avoid errors in measurements of the time-occurrence of reflections. These unwanted signals occur by reason of multiple reflections of seismic waves, for example, as shown in Fig. 5A:

Fig. 5A

Tabular, graphic, or textual material set at this point is not available. Please consult hard copy or call BNA at 1-800-372-1033.

Reflections R_1 , R_2 , and R_3 arise because of seismic waves reflected to the earth's surface from horizons RH_1 , RH_2 , and RH_3 , respectively. Multiple M_1 arises because a wave is reflected from the earth's surface to horizon RH_1 and thence again to the surface. Its travel time is twice that for reflection R_1 . M_{11} and M_{12} illustrate other types of multiple reflections. There are still others which may obscure the time-appearance of the reflections which are the features of principal interest.

Appellant describes still other techniques used to refine seismograms, such a removal of noise signals due to random earth movements, but these are not critical to appellant's invention.

Appellant's Discovery

Appellant has discovered that a family of seismograms obtained by using an *expanded* -spread of detectors can be most precisely *corrected* for the effect of the weathered layer by deriving the necessary time-correction from the time-occurrence of the first reflection on a corresponding family of seismograms obtained using a *split* -spread of detectors.

Appellant has also discovered that the reflection-wave-front of energy detected by an expanded-spread of detectors is hyperbolic in character. Based on this discovery, appellant has developed a new technique for identifying the multiples which involves

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applying functions of hyperbolic character to a family of seismograms. In this way, the magnitudes of errors in the normal moveout corrections can be determined and multiples can be separated from reflections, making it possible to remove the multiples from the seismograms.

Appellant's application emphasizes that to use his techniques, the seismograms must be "phonographically reproducible, whether on magnetic, photographic or other reproducible medium." Apparently, this is necessary because the refinement of seismograms as described above involves repeated recording and playing back of the signals representative of seismic waves.

The Appealed Method Claims

We consider claims 2 and 60 to be representative. For ease of reference and understanding we reproduce these claims in numbered paragraph format, contributed in part by us:

2. In seismic exploration, the method of establishing weathering corrections in the form of individual static time-corrections for the signals from each of a plurality of seismic detecting stations spaced one from the other along a traverse which comprises

[1] generating at generating stations seismic signals adjacent selected ones of said detecting stations whereby the magnitudes of said static corrections at said selected stations are known,

[2] applying said known static corrections respectively to signals generated at said selected stations,

[3] applying relative to said known corrections interpolated static corrections to the remaining signals generated at the remaining of said detecting stations, and thereafter

[4] generating at generating stations further seismic signals at spaced locations along said line,

[5] detecting at the location of a first group of said stations and thereafter at other locations of other groups of said stations seismic signals, said locations being selected in reference to the locations of said second-named generating stations for the production of an expanding-spread seismic-section having applied to the signals from each of said detecting stations said static corrections, and

[6] applying dynamic normal moveout corrections to the signals of each group of said detectors to correct them for geometrical spreading.

60. In seismic exploration where a family of seismograms are produced, each seismogram including multiple reflection signals and a plurality of single reflection signals representative of waves reflected from subsurface reflecting points after travel to said points over a plurality of paths, each of which for any one of said seismograms differs from the path for any other of said seismograms, the method which comprises:

[1] generating signals from each of said seismograms,

[2] applying to said generated signals a succession of dynamic time-adjustments, one for each said seismogram, and of magnitude to correct for normal moveout delays present in said seismograms,

[3] time-shifting said generated signals, the magnitude of the time-shifts varying across said family of seismograms in accordance with a plurality of approximately hyperbolic functions of different eccentricities, and

[4] adding together said generated signals for the production of summation signals representing (a) multiple reflections which add together cumulatively for certain of said hyperbolic functions, and (b) single reflections which add together cumulatively for other of said hyperbolic functions.

The Rejection

The sole rejection is based on 35 U.S.C. 101. We will refer only to the board's opinion since all points raised in the examiner's Answer are discussed therein and will refer only to the board's general remarks

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applicable to all the claims and specific remarks directed to claims 2 and 60. The board stated:

The examiner rejects each of the claims on appeal on the doctrine of In re Abrams, 38 CCPA 945 * * * 188 F.2d 165, 89 USPQ 266 . This, of course, is a rejection based on 35 U.S.C. 101 and is a finding that the subject matter sought to be patented is not embraced by the patent statutes. The examiner acknowledges that certain of the claims [including claim 2] on appeal * * * set forth physical steps that are clearly old in the Salvatori et al. and Jolly patents² * * * but asserts that patentability of the method is not dependent on these physical steps but on the other non-physical or "mental" steps set forth in these claims. * * * the examiner asserts that [the other claims including claim 60] * * * include no physical steps but set forth

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merely a method of processing data which does not require any tangible device or apparatus to carry out the method and hence could be carried out mentally.

² United States patents to Salvatori et al., 2,087,120, July 13, 1937, and Jolly, 3,105,568, Oct. 1, 1963.

Appellant * * * strongly urged that the Abrams case is not applicable law where there is a disclosure in the specification, as here, that the process can be carried out with apparatus there specified even though the method also could be carried out within the human mind without the apparatus. Appellant further contends that the Abrams Rule 1 and Rule 2 * * * are not applicable to any claim on appeal.

* * * we are not impressed by either logic or the authorities cited by appellant that a claim which embraces within its scope and is patentable only because it embraces non-statutory subject matter should be allowed on the basis of a disclosure not referred to in the claim, of a possible physical alternative to the non-physical or "mental" steps embraced by the claim. This would seem to be no more logical than it would be to allow a broad apparatus claim that read on the prior art devices solely on the basis of a particular new apparatus disclosed although not claimed specifically. In each instance it would be a case of over-claiming by an applicant to embrace by the claims that which cannot be patented under the statutes. 35 U.S.C. 100(b) provides a sanction for the claiming, as a method, the use of a known machine, and obviously would be extended to include a new use of a new machine, but the use of the machine there contemplated must be claimed and not merely disclosed in the specification.

Nor do we find any logic or authority for departing from the Rule 2 of Abrams so that claims which include both statutory physical steps and non-statutory non-physical or "mental" steps can be patentable on the sole basis of the non-statutory subject matter included therein. Were this Rule not the case, then methods of telling fortunes or predicting the activities of the stock market would be patentable providing one included the use of playing cards or a desk calculator in a claim that otherwise is for a non-statutory algorithm, such as the hypothesized principles underlying human behavior or the fluctuating values of the stock market.

In our view the merits of the examiner's rejection must turn on the applicability of either Rule 1 or Rule 2 of the Abrams case to each of the appealed claims and not on any suggested liberalization of those rules to cause the statute to embrace non-physical or "mental" activities even though they be valuable and meritorious discoveries.

We shall first consider claim 2 which, in our opinion, appears to be more illustrative of the interpretive problem than any other of the principal claims which appellant has designated as decisive of the issues on this appeal. * * *

The preamble of claim 2 refers to "signals * * * from seismic detecting stations" so that "signals" here could have only the meaning of the output of a device which senses waves transmitted through the earth. Since these signals are not specified to be electrical, mechanical or optical or to denote any other physical state or a material or thing, the sole connotation here would be that "signals" (i.e. without a modifier) are synonymous with information or *data* and are an abstraction and intangible.

In step (1) of claim 2 the expression "generating * * * seismic signals" could possibly have reference to the fact that in step (3) the detecting stations also "generate signals" and the "seismic" modifier to the term "signals" could indicate merely the seismic origin of the information content of the signals. However, to be consistent with step (5) in which "seismic" signals could only have the meaning such as earth waves, we shall construe this term in the instant claims to mean the generation of a physical state in a physical body, the earth, when the expression "seismic signals" is used and to mean the generation of abstract data when the term "signals" is used, that is *unmodified* as to any physical thing that is altered to give rise to the signals.

We find no basis for interpreting "signals" to be limited to electrical or magnetic signals as might be present in an electrical conductor or a magnetic recording media consonant with the special analog computer illustrated in appellant's drawings, for appellant expressly directs otherwise in * * * his specification, which reads as follows:

"With the foregoing outline of the operations as a whole, it will be understood that the several method steps may be carried out by a wide variety of apparatus, including computing equipment, which by a mathematical approach will provide solutions to equations which may be exact or approximate, as may be desired. In the more detailed description which follows,

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there will be presented both the field techniques and a description of simplified analog type of instruments by means of which the invention may be utilized and which are illustrative of the many features of the invention, to which the appended claims have been directed."

The carrying out of appellant's method by a "mathematical approach", through "solutions to equations" and with "computing equipment" (which we presume would be digital in character in order to contrast with the analog computer specifically illustrated) is inconsistent with the "signals", where claimed without modifier, being the result of a change in state of a physical or material thing.

The "whereby" clause of step (1) of claim 2 is a statement of a wanted result that conceals the fact that mere generation and/or detection of "seismic signals" by themselves do not make known the static corrections specified by the claim. Omitted therefrom and essential thereto is the step of exercising human judgment that would be required to interpret these signals to gain any knowledge of the static corrections needed.

However, to the extent that step (1) calls for a physical and hence a statutory process, it is fully anticipated by the Salvatori et al. and Jolly patents in which seismic signals are generated also to derive corrections to be used in seismic explorations.

Steps (2) and (3) of claim 2 apply the corrections derived from the human judgment implicit in step (1) to "signals" which are generated at various "selected" or "detecting" stations. Since "corrections" are data having no physical means for representing the same, application of corrections to signals generated at the detecting stations, as called for by these steps, necessarily is a step requiring only the compilation of data from two sources. In step (3) the corrections are required to be further "interpolated" which likewise is an act requiring human judgment.

Steps (2) and (3) are non-statutory since they require no physical act on any physical thing.

Step (4) of claim 2 sets forth a second step of physically generating "seismic signals" which finds its

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counterpart in the successive generation of seismic waves of the cited patents.

Step (5) of claim 2 detects "seismic signals" which might at first appear to be physical acts involving waves transmitted through the earth but the "signals" from each detecting station must be information or data only, since "corrections" are applied to them. Both Salvatori et al. and Jolly have detecting apparatus that carry out whatever physical acts are contemplated by step (5).

Step (6) of claim 2 applies further "corrections" to the data evolved from the detectors, and necessarily requires no physical act on any physical thing.

From the above analysis it appears that insofar as claim 2 sets forth a statutory process, it is merely the physical steps of generating a succession of seismic waves and detecting such waves following each step of generation. That which is presented to distinguish these claims over the conventional method of seismic exploration is the broad method of applying correction data to experimental data by every possible procedure, including mere mental processing of the data.

We sustain the rejection of claim 2 as for non-statutory subject matter.

Claim 60 represents a method of processing data which starts with existing seismograms and generates signals therefrom which are processed as data through successive transformations none of which specify or require the use of apparatus or the employment of any physical acts on physical things. This claim merely calls for a general mathematical or a general graphical solution of an algorithm which appellant has propounded but which cannot be patented directly, as an algorithm, or indirectly, as a series of conceptual steps in a method of solving the algorithm, under the statutes as they have been interpreted heretofore.

The rejection of claim 60 is sustained.

The opening sentence of the argument in the Patent Office brief states that,

The opinion by the Board * * * represents the best comprehensive statement of the Patent Office position.

Opinion

All claims here are method claims. All claims stand rejected on the sole ground that they are non-statutory, i.e., none defines a "process" within the meaning of 35 U.S.C. 101, read with the definition of 35 U.S.C. 100(b) in mind. The asserted reason for holding the claims non-statutory is that either all steps of the claims are "mental steps" or some of the steps are "mental" and are relied on for patentability.

The examiner said his rejection was "based

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on the three categories of claims developed in *In re Abrams*, 38 CCPA 945, 188 F.2d 165, 89 USPQ 266 (1951), and was sound because the claims fall within either the first or second categories of *Abrams*. In affirming, the board accepted the examiner's reasoning and referred to the "Rules" set forth in *Abrams*, those rules being the "categories" referred to by the examiner. The board opinion, it should be noted, was rendered several months prior to even our first opinion in *In re Prater*, 56 CCPA 1360, 415 F.2d 1378, 159 USPQ 583 (Nov. 20, 1968, Judge Smith's opinion), on *rehearing* 56 CCPA 1381, 415 F.2d 1393, 162 USPQ 541 (Aug. 14, 1969, Judge Baldwin's opinion).

Since the three so-called "Rules of *Abrams*" appear to have been the legal basis of both decisions below, as well as the basis for the Patent Office Solicitor's brief before us, we deem it appropriate to state at the outset our position as to those so-called rules, a matter which was considered in penetrating detail in our initial *Prater* opinion, delivered by the late Judge Smith, and in no way contradicted in our later

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superseding opinion, delivered by Judge Baldwin.

In *Abrams*, appellant's counsel proposed, by way of argument which he hoped would win him a reversal, "three suggested 'rules of law.'" ³ In *Abrams* the court pointed out that the proposed rules had evidently been submitted to the Patent Office and that neither the examiner nor the board had either approved or disapproved them. The court declined to adopt them. Judge Smith said in *Prater* (159 USPQ at 591) - and time and re-study do not enable us to improve on his statement - that

³ *Abrams*' counsel's proposed rules were:

1. If all the steps of a method claim are purely mental in character, the subject matter thereof is not patentable within the meaning of the patent statutes.
 2. If a method claim embodies both positive and physical steps as well as so-called mental steps, yet the alleged novelty or advance over the art resides in one or more of the so-called mental steps, then the claim is considered unpatentable for the same reason that it would be if all the steps were purely mental in character.
 3. If a method claim embodies both positive and physical steps as well as so-called mental steps, yet the novelty or advance over the art resides in one or more of the positive and physical steps and the so-called mental step or steps are incidental parts of the process which are essential to define, qualify or limit its scope, then the claim is patentable and not subject to the objection contained in 1 and 2 above.
-

* * * much confusion in subsequent interpretation of the *Abrams* decision has been caused by people misreading the decision as conferring judicial sanction upon the "rules" formulated and proposed by *Abrams*' attorney. This confusion has arisen because the court, after initially declaring there was no necessity to embrace the rules, apparently adopted Rule 2 towards the later part of the opinion. We believe this later statement was advanced not to show adoption of the rules by the court but merely to point out that even if, arguendo, the court had adopted his rules, *Abrams* would still not have prevailed in his particular fact situation.

After further discussion of the case of *Don Lee, Inc. v. Walker*, 61 F.2d 58, 14 USPQ 272 (9th Cir. 1932), cited in *Abrams* and apparently the genesis of the "mental step" concept in patent law, Judge Smith concluded, 159 USPQ at 591 and 593, and we agree:

As a partial summary of our reasoning so far, we have observed that the "Rules" of *Abrams* * * * were not given the status of judicial acceptance by the court in *Abrams* and remain no more than parts of the argument put forward by *Abrams*' counsel. Further, we note that even if "Rule 2" had been so adopted, the rule when traced to its origin in *Don Lee* rests on an uncertain basis as precedent.

We do not feel our reasoning need be encumbered by the so-called "Rules" of *Abrams* for the reasons we have indicated.

On rehearing, our new opinion by Judge Baldwin notes the fact that *Abrams* had been exhaustively analyzed in Judge Smith's opinion and expresses no disagreement with that analysis. It remains our view that we need not be encumbered in our reasoning by the "Rules" of *Abrams* for the reason that they have never enjoyed the approval of this court.

[1] Additionally, it is our view that "Rules" 2 and 3, at least, are logically unsound. According to these "Rules," a process containing both "physical steps" and so-called "mental steps" constitutes statutory subject matter if the "alleged novelty or advance in the art resides in" steps deemed to be "physical" and

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non-statutory if it resides in steps deemed to be "mental." It should be apparent, however, that novelty and advancement of an art are irrelevant to a determination of whether the nature of a process is such that it is encompassed by the meaning of "process" in 35 U.S.C. 101. Were that not so, as it would not be if "Rules" 2 and 3 were the law, a given process including both "physical" and "mental" steps could be

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statutory during the infancy of the field of technology to which it pertained, when the physical steps were new, and non-statutory at some later time after the physical steps became old, acquiring prior art status, which would be an absurd result. Logically, the identical process cannot be first within and later without the categories of statutory subject matter, depending on such extraneous factors.

Whether "Rule" 1 of Abrams would lead to a correct result on the ultimate question of patentability would depend on how one interprets "purely mental." ⁴If so construed as to encompass only steps incapable of being performed by a machine or apparatus, it might lead to a correct result. Clearly there are no steps of that nature in the presently appealed claims. If the expression "purely mental" is construed (as the board apparently did here) so as to encompass steps performable by apparatus, as well as mentally, then the "Rule" is unsound for reasons expressed below.

⁴ In this regard, see footnotes 22 and 23 of Judge Baldwin's Prater opinion. In "The Field of the Statutory Useful Arts," by Coulter, 34 J. Pat. Off. Soc'y. 417 (1952), the author points out at p. 426 what "peculiarly human activities" involve, in the second paragraph of the following extract:

There is an important point that should not be overlooked. In all of the *technological* "mental step" cases, the *claims* say nothing about mental steps or a human operator. The situation is that one or more steps are of such nature that they *can* be performed by a human operator, who is required to use his brain, and that no *device* for automatically performing such steps is specifically described in the specification. The claims are held not to define a statutory "useful art" even though, *if* the method *were* performed without a human operator (which is not excluded from the claims), it *would* constitute a statutory "useful art." In the Abrams case, for instance, there was no intimation that the specified petroleum prospecting method would not be a "useful art" if the criticized steps were performed by devices.

And to a person familiar with the available devices, it is clear that in principal *all* of the steps could be performed by devices. None of the steps involve peculiarly human mental activities which cannot, in principle, be performed by devices. None of them involve aesthetic, emotional, imaginative, or creative thought or reactions on the part of the practitioners (operators). None of them involve human "value judgments"-that is, judgments on human conduct, ethics, morals, economics, politics, law, aesthetics, etc.

The sole rejection in this case being based on the ground that the subject matter of the appealed claims is "non-statutory," we here set down the involved statute, 35 U.S.C. 101 (emphasis ours):

101. Inventions patentable

Whoever invents or discovers any new and useful *process*, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Since no question is raised as to novelty or utility, the only question is whether the claimed subject matter falls within one of the enumerated categories of patentable inventions and the only category here involved is "process." A definition of process is provided in 35 U.S.C. 100(b) reading:

(b) The term "process" means process, art or method, and includes a new use of a known process, machine, manufacture, composition of matter, or material.

The Patent Office has raised no question involving application of the definition. It simply insists that the methods of the appealed claims are not such as are encompassed by the term "process" because the claims all fall into one of two categories: (1) "all mental steps"; (2) "some mental steps and some physical steps with patentability dependent on the mental steps." The examiner himself categorized his rejection as a "mental step rejection" and this raises two questions: Are some or all of the steps in each claim "mental" and, if so, is that fatal to patentability?

[2] As may be seen from the statutory language, it contains nothing whatever which would either include or exclude claims containing "mental steps" and whatever law there may be on the subject cannot be attributed to Congress. It is purely a question of case law. That law we, like others, have found to be something of a morass. As indicated by footnote 22 in Judge Baldwin's Prater opinion, "mental" is a vague term of indefinite meaning, and whether a given step is "mental," or "purely mental," is a question which has had to be determined on a case-by-case basis, "considering all of the surrounding circumstances." Since, additionally, the legal significance of a finding that a given step was or was not "mental" or "purely mental" was itself in doubt, characterizing steps of method claims as "mental," "purely mental," "physical," or "purely physical" gave little certainty to the law. Nothing points this up as well as consideration of some of the opinions by the Patent Office Board of Appeals in cases in which the board has *reversed* "mental step" rejections.

Ex parte Moser et al., 124 USPQ 454, 455 (Board of Appeals 1959), involved claims to

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a process of operating a fluidized-bed coking unit, which process contained steps of determining a maximum permissible feed rate in accordance with a relationship between viscosity and another factor on a continuous basis and varying the severity of the coking operation in accordance therewith. The examiner rejected the claims as unpatentable in that they recited "mental steps." In reversing, the board said:

While determination of the relationship between viscosity and Conradson carbon of the feed may be in the nature of a mental process, we are not satisfied that the step of "continuously measuring the viscosity of the feed passing into the coking zone" is itself a wholly mental step requiring condemnation of the claims. Where, as here, operating conditions of a process are varied directly in accordance with the changes in a certain physical characteristic of the feed stock, it appears proper and necessary to recite the continuous measurement of this property. * * * We agree with the appellants that the essential novelty in the case is in the positive and physical step of controlling the severity of the coking operation in response to variations in viscosity of the feed oil and not in the determination of the relationship between the viscosity and Conradson carbon or in the measurement of the viscosity, which are incidental steps in the process although desirably included in the claims in order to properly define, qualify or limit their scope. We will, accordingly, not sustain the rejection of the appealed claims as drawn to unpatentable subject matter because of the recitation of mental steps.

Ex parte McNabb, 127 USPQ 456, 457-458 (Board of Appeals 1959), was concerned with claims to a method of locating defects in wooden objects such as telephone poles by radiographic methods involving several steps. A reference was cited showing radiographic testing of objects such as welded pipe to locate defects. The examiner rejected the claims on the reference because, he said, it showed the first three steps of the claims to be old and other steps could not be relied on because they were "purely mental." In disagreeing with the examiner, the board said (emphasis ours):

We have carefully considered the examiner's position but are not in agreement therewith. The step of *reading* the film with a densitometer is obviously not a mental step since a densitometer is a piece of apparatus which functions to measure the density of the film by its inherent mode of operation. *Plotting* the optical densities as a function of the film likewise is no more of a mental step than reading a thermometer or gauge and plotting the value therefrom. *Ascertaining* the deviations from

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the norm of the curve can obviously be done by means of a French curve and a pair of dividers. The deviations, if any, from the norm are clearly evident from the graph plotted from the densitometer data. *Orienting* the deviations with respect to the test object is merely aligning the graph in its proper position, as indicated by the graph itself. *None of these steps are purely mental or interpretative mental steps.* Any method or step in a method which can be manually performed and requires the use of the human eyes for detection or determination of any condition, such as temperature, pressure, time, etc., and/or the use of the hands for the purpose of manipulating, such as turning off or on or regulating a given device in a certain manner or at a certain time, etc., to produce a certain result *necessarily involves the human mind and hence can be classed as a mental step. Such steps, however, are not purely mental or interpretative mental steps and are not the kind which are prohibited by the decisions relating to purely mental steps.*

Ex parte Kahn, 124 USPQ 511, 512-514 (Board of Appeals 1959), related to a method of insect control. Evidently insects were to be selectively attracted according to species by a sound recording, to their ultimate disadvantage. The claim recited a number of steps including recording a sound signal produced by "one live female member of the selected insect species" while she was feeding during the periods around sunrise and sunset, *modifying* the signal by *amplifying* the high-frequency component to obtain an output signal, recording that signal, and then

reproducing the sound from said recording in the presence of captive live members of the insect species to be controlled, marking portions of the recording representing sounds most attractive to the captive insects based upon the behavior of the insects

and re-recording the marked portions repetitively. The examiner cited no prior art and rejected the claim because, he said, the invention could not be practiced "without the exercise of mental steps."

The board prefaced its opinion by saying,

We know of no decision that holds that a method is per se unpatentable merely because its practice requires that the operator thereof must think.

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The board stated it to be the examiner's view that in *selecting* the portions of the recording to be repetitively reproduced the selection had to be made on the basis of an evaluation "in the light of the knowledge and judgment of the individual or individuals making the recording." This he felt was "mental" and fatal to the claim. The board disagreed, saying (our emphasis):

The claim recites, however, that the first recorded sounds are reproduced in the presence of live insects and the portions of this first recording are selected or marked on the basis of the observed effect on captive insects. In other words, captive insects indicate the parts of the record attractive to them (do the selecting), the *operator observes* such fact and *appropriately marks* the record. *While it may be true that it would be advisable for the operator to think* while observing whether or not the portion of the record being played attracts the captive insects, the actual steps set out in the claim are independent of such thought and thus do not come under the types of decisions herein considered. Thus, the challenged portion of the claim is clearly a proper limitation and should be evaluated in connection with pertinent prior art as to its patentable effect or lack thereof upon the ground that it is proper limitation.

For further opinions containing similar reasoning by the board see Ex parte Egan, 129 USPQ 23 (1960), a case which, incidentally, accepted the Abrams "Rules" as established law; Ex parte Garrett, 132 USPQ 514 (1961); Ex parte Bond, 135 USPQ 160 (1961), which reaffirms the Kahn statement that a method is not unpatentable merely because its practice requires the operator to think; and Ex parte Tripp, 141 USPQ 918 (1963).

Turning now to the board decision in the present appeal, we have said above that the board used the Abrams non-rules as the primary basis of its decision that the claims are non-statutory. This was legal error for the reasons already stated.

[3] The above-quoted extracts from the board opinion further reveal that the board repeatedly asserted that steps were "mental" and rendered the claims non-statutory because they were not physical acts applied to physical things. This presumes that the law requires all steps of a statutory "process" to be physical acts applied to physical things. We considered this matter in Prater. In the first opinion by Judge Smith we showed how this erroneous idea arose from a dictum in *Cochrane v. Deener*, 94 U.S. 780 (1876), and is inconsistent with several later Supreme Court opinions. In Judge Baldwin's Prater opinion we readopted a large portion of Judge Smith's opinion on this point and again pointed out that it was a misconstruction to assume that "all processes, to be patentable, must operate physically upon substances." As above noted, the board's opinion herein was rendered before the dates of our Prater opinions. The board's contrary presumption as to the statutory requirements further infects its conclusions with legal error.

[4] Another aspect of the board's reasoning which we consider legally unsound in holding claims non-statutory resides in its giving weight to the fact that certain individual steps in the claims lacked novelty, as shown by cited art. In considering the patentability of a process consisting of a plurality of steps we think it is immaterial to the question whether the *combination* is a statutory "process" that *individual steps* are old. The whole process could be old and yet be statutory; a fortiori, it matters not that one or more steps are old.

The board also considered individual *steps* in the claims to be "non-statutory," as in its conclusion about steps (2) and (3) of claim 2. While it may be a minor matter or a mere *lapsus linguae*, we are here concerned only with whether the *combinations* of steps constituting the claimed processes are statutory "processes."

Although representative claims 2 and 60, quoted above, are directed to different aspects of appellant's invention, each of the claimed processes basically involves manipulations of certain "signals" to obtain a more meaningful record of seismic events. The "signals" may take the form of impressions on a magnetic tape, electrical impulses in an analog or digital computer, or visible patterns on graph paper or on an oscilloscope screen. The actual manipulation of the signals may be effected by apparatus or manually, depending on the form taken by the "signals," the proper degree of manipulation being definable mathematically.

[5] We cannot agree with the board that these claims (all the steps of which can be carried out by the disclosed apparatus) are directed to non-statutory processes merely because some or all the steps therein can also be carried out in or with the aid of the human mind or because it may be necessary for one performing the processes to think. All that is necessary, in our view, to make a sequence of operational steps a statutory "process" within 35 U.S.C. 101 is that it be in the technological arts so as to be in con

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sonance with the Constitutional purpose to promote the progress of "useful arts." Const. Art. 1, sec. 8.

Of course, to obtain a valid patent the claim must also comply with all the other provisions of the statute, including definiteness under 35 U.S.C. 112. A step requiring the exercise of subjective judgment without restriction might be objectionable as rendering a claim indefinite, but this would provide no statutory basis for a rejection under 35 U.S.C. 101. Moreover, as pointed out previously, the claims here on appeal clearly contain no steps of that type.

In view of the errors of reasoning of the board in reaching the legal conclusion that the claims are all non-statutory, and finding no other reasons warranting that conclusion, its decision affirming the rejection of all

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the appealed claims must be reversed.

Concurring Opinion Text

Concurrence By:

Baldwin, Judge, concurring.

I feel compelled to speak out against the majority opinion. It is my position that the doctrine promulgated by that opinion, which constitutes a major and radical shift in this area of the law, is a serious breach with the time-honored judicial practice of resolving important questions of law on a case-by-case basis, a policy matter which I thought had been settled by agreement of the full court with the second Prater decision and which up to now the court has followed. In addition, I feel that the course which the majority opinion takes is not only unnecessary in order to decide this particular case (or any others in this area, for that matter), but also will probably create more problems than it is intended to solve. Finally, I must point out that the majority embarked on this course without having been asked to do so by appellant.

What The Majority Opinion Does

One need only read the last page of the opinion to find the principal holding: "All that is necessary * * * to make a sequence of operational steps a statutory 'process' within 35 U.S.C. 101 is that it be in the technological arts." No limitations are placed upon this holding. In effect it is a pronouncement of new law.

At first reading, it may appear that this holding is but a resurrection of that made in Judge Smith's opinion in the first Prater decision. Closer analysis reveals that the majority now goes much beyond the holding of our late colleague. A major basis of the holding in that first Prater opinion was that the claimed process must be "*disclose* as being a sequence or combination of steps, *capable of performance without human intervention*." [Emphasis added]. The opinion was clearly dealing with claims drawn primarily to cover a machine-implemented process but which were found to read also on carrying out the process using mental steps.

Here, however, the majority does not so limit its holding. Musgrave obviously discloses a process which can be implemented entirely by machine. Indeed, he argues with respect to some of his claims that it is unreasonable to interpret them as covering anything but a machine-implemented process. Nevertheless, the majority now says, in effect, that one no longer need disclose apparatus for carrying out his process.

Thus, while not only being a drastic departure from the policy decision implicit in the second Prater case, i.e., to decide the problems in this area of mental processes on a case-by-case basis, the majority opinion also goes far beyond the holding in the first Prater decision. As such, it should be recognized as overruling those cases which were so carefully *distinguished* by Judge Smith in Prater I.

Is This Change Really Necessary?

Academically, intellectually, perhaps, the majority's new proposal to throw out entirely the "mental steps" doctrine and replace it with a new rule may sound appealing. Any process which is drawn to a technological art is now held to come within the ambit of the Patent Laws. I submit, however, that this court should concern itself only with realities and let the law professors worry about academic problems. The realities here are that "mental steps" are no longer a serious problem.

The actual ruling in Prater II was that the process claims there involved covered more than the appellant conceded they were intended to cover and that those claims were therefore unpatentable under 35 U.S.C. 112. In dictum, however, the court resolved the biggest problem then facing the patent community, i.e., whether process claims drawn to cover the operation of a programmed digital computer would be

subject to the protection of the patent statutes. With regard to the mental steps problem, the court further made it clear that the only proper inquiry should be as follows: Assuming the disclosure of a novel, unobvious machine-implemented process, would a *reasonable*¹

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interpretation of the claims include coverage of the process implemented by the human mind?

¹ As applied in *Prater II* and *Mahony* (infra, note 3), the standard of reasonableness would be the meaning of the claims to one of ordinary skill in the pertinent art when read in light of and consistently with the specification.

More recent cases before this court have made it clear that there is now only a very narrow scope to this "fearful" mental steps doctrine. In *In re Bernhart*² and *In re Mahony*,³ we found that the process claims there involved, when interpreted reasonably, did *not* include within their coverage mental implementation. Additionally, Rule 2 of what the majority calls the "Abrams non-rules" was given a fatal blow in *Bernhart* where we held that a claimed invention is not non-statutory *merely* because "the novelty is indicated by an expression which does not itself fit in a statutory class", 163 USPQ at 615. Further, in *Mahony*, the Patent Office view that a claim reading on both statutory and non-statutory subject matter could not comply with the second paragraph of section 112 was discarded.

² 57 CCPA 737, 417 F.2d 1395, 163 USPQ 611 (1969).

³ 57 CCPA 939, 421 F.2d 742, 164 USPQ 572 (1970).

What is left? I submit that in reality very little remains of the "mental steps" doctrine. Before now, the court has not found it necessary to decide whether a claim, drawn to cover a disclosed machine-implemented process but broad enough, even when interpreted reasonably, to cover the same process implemented only with the aid of the human mind, would be statutory. It was also undecided as to what effect the inclusion of a *purely* mental step, as defined in footnote 22 of *Prater II*, might have on an otherwise statutory claim.⁴ Nor did the court decide whether claims drawn to a process consisting entirely of a sequence of *purely* mental steps would fit within the ambit of 35 U.S.C. 101. The majority now proposes to answer all these questions in the affirmative, regardless of the fact that this case could be decided on very narrow grounds.

⁴ But see *In re Jones*, 54 CCPA 1218, 373 F.2d 1007, 153 USPQ 77 (1967).

I agree with appellant that claim 60, when reasonably interpreted, covers only a machine-implemented process. The decision with regard to that claim and those related to it could have been resolved on that narrow ground. With regard to claim 2 and those other claims which recite a number of "mental" steps along with physical steps, if the court found that they are predicated for patentability on the mental steps (as I believe they are), the board's decision could be *reversed* by simply following the *Bernhart* dictum mentioned earlier and approving those enlightened board decisions referred to in the majority opinion which hold, in effect, that if a mental step is not *purely* mental, the process including it is within the

statutory category of "process" set out in 35 U.S.C. 101. This holding would flow naturally from what has been said and held in our earlier opinions, and would be all that is necessary to support reversal of the decision below.

Foreseeable Problems

It seems that whenever a court decides to go beyond what is necessary to decide the case before it, more problems are generated than are solved. I foresee quite a few with the majority's new holding.

First and foremost will be the problem of interpreting the meaning of "technological arts". Is this term intended to be synonymous with the "industrial technology" mentioned by Judge Smith? It sounds broader to me. Necessarily, this will have to be considered a question of law and decided on a case-by-case basis. Promulgation of any all-encompassing definition has to be impossible. This task is now before us.

Already alluded to is the apparent decision not to require that a machine-implemented process be disclosed. This might have some salutary effect in certain circumstances, where machine implementation would be obvious from disclosure of the process steps alone. But what happens where it is not so obvious? Then we could get involved in deciding, first, whether a reasonable interpretation of the claims would include both machine and mental implementation of the process and, second, whether the absence of a disclosure of apparatus for carrying out the process would warrant rejection of the broad process claims for lack of support.

Justifying the decision finding claims drawn entirely to *purely* mental processes to be statutory, the majority states that "[a] step requiring the exercise of subjective judgment without restriction might be objectionable as rendering a claim indefinite." It should not require much imagination to see the many problems sure to be involved in trying to decide whether a step requiring certain human judgment evaluations is definite or not.

As one more example, suppose a claim happens to contain a sequence of operational steps which can reasonably be read to cover a process performable both within *and without* the technological arts? This is not too far fetched. Would such a claim be statutory? Would it comply with section 112? We will have to face these problems some day.

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In conclusion, I think it is apparent that what the majority has done will only substitute for one set of problems another possibly more complex set. Because the problems will be new, they will add confusion to the law. We are only now beginning to make some sense out of this area of the law. To change at this time, I submit, is non-sense.

- End of Case -

APPENDIX C

INTERIM GUIDELINES (pp. 46-47)

Interim Guidelines

1300 Off. Gaz. Pat. Office 142 (Nov. 22, 2005)

if any, applicability to determining the presence of statutory subject matter.” State Street, 149 F.3d at 1374, 47 USPQ2d at 1601.

The Federal Circuit further stated “after Diehr and Alappat, the mere fact that a claimed invention involves inputting numbers, calculating numbers, outputting numbers and storing numbers, in and of itself, would not render it nonstatutory” State Street, 149 F.3d at 1374, 47 USPQ2d at 1602 (citing In re Alappat, 33 F.3d at 1544, 31 USPQ2d at 1557). The Federal Circuit in an en banc decision pointed out that “the ultimate issue always has been whether the claim as a whole is drawn to statutory subject matter.” Alappat, 33 F.3d at 1543 n. 21, 31 USPQ2d at 1557 n. 21.

In AT&T, the Federal Circuit focused the inquiry on whether the claim as a whole is drawn to statutory subject matter, deemed the “ultimate issue” by Alappat, rather than on the Freeman-Walter-Abele test which dissects the claim by removing the labeled nonstatutory subject matter and then labels the remaining portion of the claim as either data gathering steps or insignificant post solution activity. AT&T, 172 F.3d at 1359, 50 USPQ2d at 1453. The Federal Circuit concluded that “[w]hatever may be left of the earlier [Freeman-Walter-Abele] test, if anything, this type of physical limitations analysis seems of little value.” Id. Therefore, USPTO personnel should no longer rely on the Freeman-Walter-Abele test to determine whether a claimed invention is directed to statutory subject matter.

c. (i) The Mental Step Test

If a claimed process is performed by a machine, it is immaterial whether some or all the steps could be carried out by the human mind. As stated in Musgrave, 431

F.2d at 893, 167 USPQ at 289-90: “[w]e cannot agree with the board that these claims (all the steps of which can be carried out by the disclosed apparatus) are directed to non-statutory processes merely because **some or all** [emphasis added] the steps therein can also be carried out in or with the aid of the human mind or because it may be necessary for one performing the processes to think.” Therefore, USPTO personnel should no longer rely on the mental step test to determine whether a claimed invention is directed to statutory subject matter. If all the steps of a claimed process can be carried out in the human mind, examiners must determine whether the claimed process produces a useful, tangible, and concrete result, i.e., apply the practical application test set forth in State Street.

c. (ii) The Human Step Test

It is immaterial whether the process may be performed by some or all steps that are carried out by a human. Claims are not directed to non-statutory processes merely because **some or all** the steps therein can also be carried out in or with the aid of a human or because it may be necessary for one performing the processes to do some or all of the process steps. The inclusion in a patent of a process that may be performed by a person is not fatal to patentability. Alco Standard Corp. v. Tennessee Valley Authority, 808 F.2d 1490, 1496, 1 USPQ2d 1337, 1341 (Fed. Cir. 1987) (citing Diehr, 450 U.S. at 175); see e.g. Smith & Nephew, Inc. v. Ethicon, Inc., 276 F.3d 1304, 61 USPQ2d 1065 (Fed. Cir. 2001) (method claim where all the steps are carried out by a human). Therefore, USPTO personnel should no longer rely on the human step test to determine whether a claimed invention is directed to statutory subject matter.

APPENDIX D

APPLICATION OF ROYKA

United States Court of Customs and Patent Appeals.
Application of Stephen F. ROYKA and Robert G. Martin.

Patent Appeal No. 9092.

Feb. 7, 1974.

Appeal from the decision of the Patent Office Board of Appeals affirming the examiner's rejection of patent application, Serial No. 648,701, for a 'responsive answer system.' The Court of Customs and Patent Appeals, Rich, J., held that an answer sheet for use in self-instruction and testing, in which were printed in 'response areas' meaningful information in permanent printing and confusing information in printing which could be removed, as by an erasure, both being legible so that a student, seeing a choice of answers to a question, was required to make a selection, the correctness of the selection being shown by the information which was then removed by the erasure, was not anticipated by prior patents and was therefore patentable.

Reversed.

West Headnotes

Patents ¶66(1.20)

291k66(1.20) Most Cited Cases

"Responsive answer system," answer sheet for use in self-instruction and testing, in which were printed in "response areas" meaningful information in permanent printing and confusing information in printing which could be removed, as by erasure, both being legible so that student, seeing a choice of answers to question, was required to make selection, correctness of selection being shown by information which was then removed by erasure, was not anticipated by prior patents and was therefore patentable. 35 U.S.C.A. §§ 102, 103.

Patents ¶328(2)

291k328(2) Most Cited Cases

3,055,117, 3,364,857. Cited.

Patents ¶328(1)

291k328(1) Most Cited Cases

356,695. Cited.

*981 Michael H. Shanahan, Rochester, N.Y., of record, for

appellant; Thomas M. Webster, Rochester, N.Y., Boris Haskell, Washington, D.C. (Paris, Haskell & Levine), Washington, D.C., of counsel.

Joseph F. Nakamura, Washington, D.C., for the Commissioner of Patents. Fred W. Sherling, Washington, D.C., of counsel.

Before MARKEY, Chief Judge, and RICH, BALDWIN, LANE and MILLER, judges.

RICH, Judge.

This appeal is from the decision of the Patent Office Board of Appeals affirming the examiner's rejection of claims 28 and 30-36 of application serial No. 648,701, filed June 26, 1967, entitled 'Responsive Answer System.' We reverse.

The Invention

The appealed claims are directed to a device in the nature of an answer sheet for use in self-instruction and testing. The answer sheet may be associated with questions or separate therefrom. The essential features of the invention are that there are printed on the answer sheet in 'response areas' meaningful information in permanent printing and confusing information in printing which can be removed, as by an eraser, both being legible so that a student, seeing a choice of answers to a question, must make a selection. Having made a selection, he then applies an eraser to the selected response area and some of the information will be readily removed. What remains advises him of the correctness or otherwise of his answer. The following figures from the drawings are illustrative:

PERMANENT MEANINGFUL	PERMANENT
MEANINGFUL	
INFORMATION PLUS REMOVABLE	INFORMATION
CONFUSING INFORMATION	

A. TRUE

Y NO

E

S

A.

Y

E

S

WRONG

B. FALSE
N YES
O
RIGHT

B.
N
O

FIG. 1A

FIG. 1B

Fig. 1A shows two response areas to a given question before any removing action *982 by the student has taken place and Fig. 1B shows the permanent information remaining in each after erasure of the removable information. Of course, if the student makes an initial choice of area A, showing up 'YES' or some other indication of a correct answer, he will not need to proceed further and erase the B area. In a modified form of the invention, a wrong selection, plus erasure, may expose, instead of or in addition to a statement that the answer is wrong, a number or other reference to further material which is to be studied.

A preferred method of printing the permanent meaningful information and the removable confusing information is by that type of xerography in which a fusible toner is used, the permanence of the printing depending on the extent to which the toner image is 'fixed' or fused by heat. By successive printings of the two kinds of information with fixing to different degrees, one image can be made permanent and the other made subject to easy removal, both images retaining such similarity of appearance that the user of the answer sheet cannot tell them apart.

Claim 28 is the principal claim, all others being dependent thereon, and reads as follows:

28. A device for selectively indicating information comprising

a support having response areas for presenting information for selection,

permanent printing indicative of meaningful information permanently fixed to said support within a response area, and

removable printing indicative of confusing information removably fixed to said support within a response area,

said meaningful and confusing information being substantially legible even when said permanent and removable printing are fixed over one another on said support,

said permanent and removable printing being substantially similar such that an observer cannot determine which information is permanent and which is removable

whereby the information within a response area is selected by attempting to remove the printing therein with the failure to remove printing identifying meaningful information.

Claims 30-36 add limitations which need not be considered except for noting that claims 33 and 34 alone specify the use of a xerographic toner, for which reason they were rejected on a different ground from the other claims.

The Rejection

The following references were relied on:

Reid et al. (Reid) 356,695 Jan. 25, 1987

Bernstein et al. (Bernstein) 3,055,117 Sep. 25, 1962

Lein et al. (Lein) 3,364,857 Jan. 23, 1968

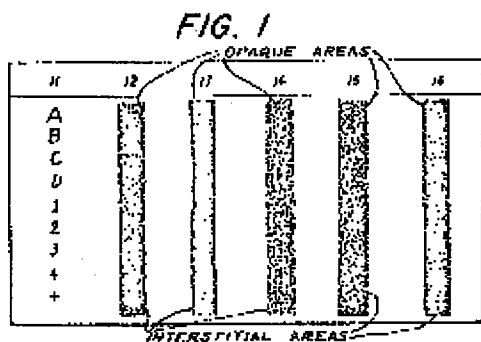
(filed Feb. 2, 1966)

Claims 28, 30, 31, and 32 were rejected as anticipated under 35 U.S.C. § 102 by Bernstein; claims 28, 31, 32, 35, and 36 were rejected as anticipated under § 102 by Reid; and claims 33 and 34 were rejected under 35 U.S.C. § 103 for obviousness, on either Bernstein or Reid in view of Lein. These were the examiner's rejections and the board affirmed them, adhering to its decision on reconsideration.

Bernstein discloses an answer sheet in which printed information representing a response is 'temporarily concealed from the observer' and he discloses a number of different ways of effectively concealing the response. His specification states:

The objects of the invention are accomplished by utilizing the hiding media to confuse the participant and to render the response and the hiding media indistinguishable and thus conceal the presence, absence, nature or position of the response from the participant. This may be effectuated by careful attention being paid to a number of factors including the design, *983 color and position of the hiding or confusing media.

Fig. 1 of Bernstein's drawings, illustrates some of his concealing means:



The

following is the written description:

Referring now to the drawing, FIG. 1 illustrates some of the many optically confusing patterns which may be positioned between the printed structure to be concealed and the point of observation. Column 11 shows the information which is to be concealed. This information is repeated in columns 12 through 16 but in each case is concealed by a pattern in accordance with the present invention. Column 12 utilizes a pattern comprising an alphabetical maze in both line and half tone screen. Column 13 utilizes a pattern comprising an absorbing field having a plurality of irregular dot-like interstices. Column 14 utilizes a pattern comprising a maze of plus signs combined with dots. Columns 15 and 16 illustrate irregular and non-repetitious patterns.

Bernstein says that if at least 50% Of the response is

actually covered by the opaque portions of the confusion pattern, complete concealment is obtained. He also says that added means of concealment may be used, such as scoring and embossing and perforating the paper in order to scatter the light or let it shine through.

Reid is entitled 'Transformation Picture and Print.' The invention is said to be useful for advertisements, Christmas cards, birthday cards, valentines, and the like and as a source of amusement and instruction for children. It consists of a picture or print, part of which is permanently printed and part of which is removable from the paper on which it is printed. For the latter various soluble undercoatings or inks are described. If the picture is washed with a solvent, which may be water, the removable part disappears and the pictorial and/or typographic matter changes. The invention is illustrated by a typical nineteenth century temperance propaganda piece depicting the evils of drink. In the finished picture there are three scenes from left to right: Scene 1, the innocent child leads her father home from the pub; Scene 2, Father sits slumped in the kitchen chair with his bottle beside him, the family wash hanging above his head, this picture being entitled 'The Effects of Drink'; Scene 3, Mother stands in front of a sign reading 'Pawn Shop.' Across the bottom of the picture is a legend which says 'Wash the above and see what water will do.' Fig. II shows the result of washing with water: Scene 1, a handsome young man and his happy daughter stroll on the street; Scene 2, Father sits erect in a well-appointed room at a clothcovered table, apparently having a cup of tea, obviously a gentleman; Scene 3, Mother beams from the sideline and the Pawn Shop sign has vanished. Two new subscriptions appear and the words 'The' and 'Drink' have disappeared, the resultant being a new picture title reading 'The Beneficial Effects of Temperance.' 'The Beneficial' and 'Temperance' were covered by some soluble opaque in the original picture. No doubt the overall effect is instruction. Perhaps there was amusement in bringing about the transformation.

Lein relates to xerography and is relied on only for its disclosure of the removability of partially fused toner and the permanence of fully fused toner.

OPINION

As to the § 102 anticipation rejections, it will suffice to consider independent claim 28. If it is not fully met by Reid *984 or Bernstein, neither are the more limited dependent claims. It is elementary that to support an anticipation rejection, all elements of the claim must be found in the reference. We do not find claim 28 anticipated by Bernstein because, as we read the claim, it requires the display of legible meaningful and legible confusing information simultaneously, between which the user of the device may make a selection before he undertakes to remove any of the information from the response area selected by him. The element we find most clearly missing, contrary to the reasoning of the examiner and the board, is the legible confusing information. The Patent Office proposes to read this limitation on Bernstein's confusion patterns which are nothing but meaningless obscuring screens, conveying no information and providing the user with no basis for making a selection, as called for by claim 28. In appellants' device the legible confusing information-- i.e., the wrong answers-- are legible in the sense that they can be read as intelligible words, not merely a jumble of type serving to obscure the words of the wrong answers.

Appellants were fully aware of Bernstein and discussed its disclosures in their specification, distinguishing from this and other prior art, saying, in part:

The inventive concept hereof confuses not by physical blocking as taught by the prior art, but by compounding, associating (including disarranging) permanent information with confusing information, usually at least some of which is similar in character to the permanent information as to render it impossible to tell which is permanent and which is removable confusing information. In the invention, generally no attempt is made to designedly physically cover the permanent information, but to confuse it beyond interpretation by the presentation of extraneous removable, confusing information.

Claims are not to be read in a vacuum and while it is true they are to be given the broadest reasonable interpretation during prosecution, their terms still have to be given the meaning called for by the specification of which they form a part. We cannot read the terms 'legible' and 'information' on Bernstein's confusion patterns, as did the examiner and the

board. They are not 'legible,' as appellants use the term, and they convey no information.

As to anticipation by Reid, we find neither appellants' basic concept nor the substance of claim 28 to be disclosed. Apparently the solicitor could find little to support the rejection in Reid for all he says in his brief-- so far as claim 28 is concerned-- is:

Reid discloses a sheet which may be used for instruction and which may have a removable design partly covering a fixed design * * *. Therefore, the disclosure of the reference encompasses the arrangement wherein a removable design covers a fixed design with both designs being substantially legible.

But claim 28 does not call for an arrangement wherein a removable design covers a fixed design. It calls for response areas, which Reid does not have, containing meaningful information in permanent printing together with removable printing conveying confusing information, both legible at the same time, between which a 'selection' can be made. The only choice offered to the user by Reid is to follow the instruction to wash the whole visible picture with water or other solvent, thus removing the overprinting, to discover what the permanent picture is. The Patent Office attempt to read claim 28 on this reference is a tour de force. We hold that Reid does not anticipate for failure to meet the limitations of claim 28 to 'response areas,' to the presentation of two categories of information (meaningful-permanent and removable-confusing) within such areas, and the possibility of selection. Anticipation requires a finding that the claimed invention be disclosed. It is not enough to say that appellants' invention and the reference are *985 both usable for instruction and both consist of permanent and removable printings on paper, as did the solicitor.

The dependent claims rejected with claim 28, as anticipated under § 102, are not anticipated since claim 28 is not anticipated. Some of them merely add features which are disclosed by the references and some do not. Insofar as they do not, they further negative anticipation. The examiner recognized this fact as to claims 33 and 34, which are limited to xerography, and therefore did not reject them

under § 102. Similarly, he did not reject claim 30 on Reid or claims 35 and 36 on Bernstein. We find that claims 35 and 36 contain limitations which additionally distinguish from Reid. We have already noted that Reid had no 'response areas' as required by claim 28 and so Reid does not disclose the structure of claim 35 which additionally requires both the correct and incorrect answers to appear within the same response area.

As to claim 36, the examiner said it 'is merely a printed matter variation of the design of the reference,' Reid. This is not a valid reason for rejection. Printed matter may very well constitute structural limitations upon which patentability can be predicated. We have commented on this matter In re Jones, 373 F.2d 1007, 54 CCPA 1218 (1967); and In re Miller, 418 F.2d 1392, 57 CCPA 809 (1969), and will not repeat ourselves. The limitations of claim 36 are not remotely suggested by Reid.

There remains the § 103 rejection of claims 33 and 34. Do they, taken together with all of the limitations of claim 28 from which they depend, define obvious subject matter? The difference between claim 28 and these two dependent claims is that they add the limitations to xerography. If Bernstein and Reid showed the claimed invention except for xerography, the addition of the Lein reference would make the subject matter of the claims obvious. But that is not the situation here. Adding the knowledge of xerographic technology to Bernstein or Reid still does not make the invention of claims 33 and 34 obvious for the same reasons we have given above in discussing anticipation. The essence of appellants' invention, as set forth in claim 28, is still missing notwithstanding the addition of the Lein reference and we see nothing in the combinations of references which would have made the invention obvious to one of ordinary skill in the art at the time it was made. We will, therefore, reverse this rejection.

The decision of the board is reversed.

Reversed.

490 F.2d 981, 180 U.S.P.Q. 580

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APPENDIX E
IN RE VAECK

United States Court of Appeals,
Federal Circuit.

In re Mark A. VAECK, Wipa Chungjatupornchai and Lee
McIntosh.

No. 91-1120.

Oct. 21, 1991.

Inventor sought patent for claimed invention directed to use of genetic engineering techniques for production of insecticidal proteins. The United States Patent and Trademark Office Board of Patent Appeals and Interferences affirmed an examiner's rejection of certain claims, and appeal was taken. The Court of Appeals, Rich, Circuit Judge, held that: (1) patent application was improperly rejected on ground of prima facie obviousness, and (2) patent application was properly rejected to extent that claims were too general to enable person skilled in art to make and use claimed invention without undue experimentation.

Affirmed in part, reversed in part.

Mayer, Circuit Judge, dissented and filed opinion.

West Headnotes

[1] Patents ⚡314(5)

291k314(5) Most Cited Cases

Obviousness of invention for which patent is sought is legal question which court independently reviews, though based upon Patent and Trademark Office's underlying factual findings, which court reviews under clearly erroneous standard. 35 U.S.C.A. § 103.

[2] Patents ⚡16(2)

291k16(2) Most Cited Cases

In reviewing rejection of invention for patent as obvious in view of combination of prior art references, court considers whether prior art would have suggested to those of ordinary skill in art that they should make claimed composition or device, or carry out claimed process, and whether prior art would also have revealed that in so making or carrying out, those of ordinary skill would have reasonable expectation of success; both suggestion and reasonable expectation of success must be found in prior art, not in applicant's

disclosure. 35 U.S.C.A. § 103.

[3] Patents ⚡16.25

291k16.25 Most Cited Cases

Patent application for genetic engineering techniques for production of insecticidal proteins was improperly rejected on ground of prima facie obviousness; prior art did not disclose or suggest expression in cyanobacteria of chimeric gene encoding insecticidally active protein, or convey to those of ordinary skill reasonable expectation of success in doing so. 35 U.S.C.A. § 103.

[4] Patents ⚡99

291k99 Most Cited Cases

To be patentable, specification of patent must enable any person skilled in art to which it pertains to make and use claimed invention without undue experimentation. 35 U.S.C.A. § 112.

[5] Patents ⚡99

291k99 Most Cited Cases

Patent application for using genetic engineering techniques to produce insecticidal proteins was properly rejected to extent that claims were too general to enable person skilled in art to make and use claimed invention without undue experimentation; claim referred to use of cyanobacteria in general as host organism, despite fact that cyanobacteria were diverse and relatively poorly studied group of organisms, comprising some 150 different genera, with successful use of any one type in manner called for in invention being unpredictable. 35 U.S.C.A. § 112.

[6] Patents ⚡99

291k99 Most Cited Cases

Although patent applicants are not required to disclose every species encompassed by their claims, even in unpredictable art, in order to satisfy enablement requirement for patentability, there must be sufficient disclosure, either through illustrative examples or terminology, to teach those of ordinary skill how to make and how to use invention as broadly as it is claimed. 35 U.S.C.A. § 112.

Patents ⚡328(2)

291k328(2) Most Cited Cases

4,695,455. Cited.

*489 Ian C. McLeod, Ian C. McLeod, P.C., Okemos, Mich., argued for appellant.

Teddy S. Gron, Associate Sol., Office of the Sol., of Arlington, Va., argued for appellee. With him on the brief were Fred E. McKelvey, Sol. and Richard E. Schafer, Associate Sol.

Before RICH, ARCHER, and MAYER, Circuit Judges.

RICH, Circuit Judge.

This appeal is from the September 12, 1990 decision of the Patent and Trademark Office (PTO) Board of Patent Appeals and Interferences (Board), affirming the examiner's rejection of claims 1-48 and 50-52 of application Serial No. 07/021,405, filed March 4, 1987, titled "Hybrid Genes Incorporating a DNA Fragment Containing a Gene Coding for an Insecticidal Protein, Plasmids, Transformed Cyanobacteria Expressing Such Protein and Method for Use as a Biocontrol Agent" as unpatentable under 35 U.S.C. § 103, as well as the rejection of claims 1-48 and 50-51 under 35 U.S.C. § 112, first paragraph, for lack of enablement. We reverse the § 103 rejection. The § 112 rejection is affirmed in part and reversed in part.

BACKGROUND

A. The Invention

The claimed invention is directed to the use of genetic engineering techniques [FN1] for production of proteins that are toxic to insects such as larvae of mosquitos and black flies. These swamp-dwelling pests are the source of numerous human health problems, including malaria. It is known that certain species of the naturally-occurring *Bacillus* genus of bacteria produce proteins ("endotoxins") that are toxic to these insects. Prior art methods of combatting the insects involved spreading or spraying crystalline spores of the insecticidal *Bacillus* proteins over swamps. The spores were environmentally unstable, however, and would often sink to the bottom of a swamp before being consumed, thus rendering this method prohibitively expensive. Hence the need for a lower-cost method of producing the insecticidal *Bacillus* proteins in high volume, with application in a more stable vehicle.

[FN1]. Basic vocabulary and techniques for gene cloning and expression have been described in In re O'Farrell, 853 F.2d 894, 895-99, 7 U.S.P.Q.2d 1673, 1674-77 (Fed.Cir.1988), and are not repeated here.

As described by appellants, the claimed subject matter meets this need by providing for the production of the insecticidal *Bacillus* proteins within host cyanobacteria. Although both cyanobacteria and bacteria are members of the procaryote [FN2] kingdom, the cyanobacteria (which in the past have been referred to as "blue-green algae") are unique among procaryotes in that the cyanobacteria are capable of oxygenic photosynthesis. The cyanobacteria grow on top of swamps where they are consumed by mosquitos and black flies. Thus, when *Bacillus* proteins are produced within *490 transformed [FN3] cyanobacterial hosts according to the claimed invention, the presence of the insecticide in the food of the targeted insects advantageously guarantees direct uptake by the insects.

[FN2]. All living cells can be classified into one of two broad groups, procaryotes and eucaryotes. The procaryotes comprise organisms formed of cells that do not have a distinct nucleus; their DNA floats throughout the cellular cytoplasm. In contrast, the cells of eucaryotic organisms such as man, other animals, plants, protozoa, algae and yeast have a distinct nucleus wherein their DNA resides.

[FN3]. "Transformed" cyanobacteria are those that have successfully taken up the foreign *Bacillus* DNA such that the DNA information has become a permanent part of the host cyanobacteria, to be replicated as new cyanobacteria are generated.

More particularly, the subject matter of the application on appeal includes a chimeric (i.e., hybrid) gene comprising (1) a gene derived from a bacterium of the *Bacillus* genus whose product is an insecticidal protein, united with (2) a DNA promoter effective for expressing [FN4] the *Bacillus* gene in a host cyanobacterium, so as to produce the desired insecticidal protein.

FN4. "Expression" of a gene refers to the production of the protein which the gene encodes; more specifically, it is the process of transferring information from a gene (which consists of DNA) via messenger RNA to ribosomes where a specific protein is made.

The claims on appeal are 1-48 and 50-52, all claims remaining in the application. Claim 1 reads:

1. A chimeric gene capable of being expressed in Cyanobacteria cells comprising:
 - (a) a DNA fragment comprising a promoter region which is effective for expression of a DNA fragment in a Cyanobacterium; and
 - (b) at least one DNA fragment coding for an insecticidally active protein produced by a *Bacillus* strain, or coding for an insecticidally active truncated form of the above protein or coding for a protein having substantial sequence homology to the active protein,

the DNA fragments being linked so that the gene is expressed.

Claims 2-15, which depend from claim 1, recite preferred *Bacillus* species, promoters, and selectable markers. FN5 Independent claim 16 and claims 17-31 which depend therefrom are directed to a hybrid plasmid vector which includes the chimeric gene of claim 1. Claim 32 recites a bacterial strain. Independent claim 33 and claims 34-48 which depend therefrom recite a cyanobacterium which expresses the chimeric gene of claim 1. Claims 50-51 recite an insecticidal composition. Claim 52 recites a particular plasmid that appellants have deposited.

FN5. In the context of the claimed invention, "selectable markers" or "marker genes" refer to antibiotic-resistance conferring DNA fragments, attached to the gene being expressed, which facilitate the selection of successfully transformed cyanobacteria.

B. Appellants' Disclosure

In addition to describing the claimed invention in generic terms, appellants' specification discloses two particular species of *Bacillus* (*B. thuringiensis*, *B. sphaericus*) as

sources of insecticidal protein; and nine genera of cyanobacteria (*Synechocystis*, *Anacystis*, *Synechococcus*, *Agmenellum*, *Aphanocapsa*, *Gloecapsa*, *Nostoc*, *Anabaena* and *Ffremyllia*) as useful hosts.

The working examples relevant to the claims on appeal detail the transformation of a single strain of cyanobacteria, i.e., *Synechocystis* 6803. In one example, *Synechocystis* 6803 cells are transformed with a plasmid comprising (1) a gene encoding a particular insecticidal protein ("B.t. 8") from *Bacillus thuringiensis* var. *israelensis*, linked to (2) a particular promoter, the P_L promoter from the bacteriophage Lambda (a virus of *E. coli*). In another example, a different promoter, i.e., the *Synechocystis* 6803 promoter for the rubisco operon, is utilized instead of the Lambda P_L promoter.

C. The Prior Art

A total of eleven prior art references were cited and applied, in various combinations, against the claims on appeal.

The focus of Dzelzkalns, FN6 the primary reference cited against all of the rejected claims, is to determine whether chloroplast promoter sequences can function in cyanobacteria. To that end Dzelzkalns discloses the expression in cyanobacteria of a chimeric gene comprising a chloroplast promoter*491 sequence fused to a gene encoding the enzyme chloramphenicol acetyl transferase (CAT). FN7 Importantly, Dzelzkalns teaches the use of the CAT gene as a "marker" gene; this use of antibiotic resistance-conferring genes for selection purposes is a common technique in genetic engineering.

FN6. 12 *Nucleic Acids Res.* 8917 (1984).

FN7. Chloramphenicol is an antibiotic; CAT is an enzyme which destroys chloramphenicol and thus imparts resistance thereto.

Sekar I, FN8 Sekar II, FN9 and Ganesan FN10 collectively disclose expression of genes encoding certain *Bacillus* insecticidal proteins in the bacterial hosts *B. megaterium*, *B. subtilis* and *E. coli*.

FN8. 137 *Biochem. and Biophys. Res. Comm.* 748

947 F.2d 488

947 F.2d 488, 20 U.S.P.Q.2d 1438

(Cite as: 947 F.2d 488)

(1986).

FN9. 33 *Gene* 151 (1985).FN10. 189 *Mol. Gen. Genet.* 181 (1983).

Friedberg [FN11] discloses the transformation of the cyanobacterium *Anacystis nidulans* R2 by a plasmid vector comprising the $O_L P_L$ operator-promoter region and a temperature-sensitive repressor gene of the bacteriophage Lambda. While the cyanobacteria are attractive organisms for the cloning of genes involved in photosynthesis, Friedberg states, problems may still be encountered such as suboptimal expression of the cloned gene, detrimental effects on cell growth of overexpressed, highly hydrophobic proteins, and rapid turnover of some gene products. To address these problems, Friedberg teaches the use of the disclosed Lambda regulatory signals in plasmid vehicles which, it states, have "considerable potential for use as vectors the expression of which can be controlled in *Anacystis*...."

FN11. 203 *Mol. Gen. Genet.* 505 (1986).

Miller [FN12] compares the initiation specificities *in vitro* of DNA-dependent RNA polymerases [FN13] purified from two different species of cyanobacteria (*Fremyella diplosiphon* and *Anacystis nidulans*), as well as from *E. coli*.

FN12. 140 *J. Bacteriology* 246 (1979).

FN13. RNA polymerase, the enzyme responsible for making RNA from DNA, binds at specific nucleotide sequences (promoters) in front of genes in DNA, and then moves through the gene making an RNA molecule that includes the information contained in the gene. Initiation specificity is the ability of the RNA polymerase to initiate this process specifically at a site(s) on the DNA template.

Nierzwicki-Bauer [FN14] identifies in the cyanobacterium *Anabaena* 7120 the start site for transcription of the gene encoding *rbcL*, the large subunit of the enzyme ribulose-1,5-bisphosphate carboxylase. It reports that the

nucleotide sequence 14-8 base pairs preceding the transcription start site "resembles a good *Escherichia coli* promoter," but that the sequence 35 base pairs before the start site does not.

FN14. 81 *Proc. Natl. Acad. Sci. USA* 5961 (1984).

Chauvat [FN15] discloses host-vector systems for gene cloning in the cyanobacterium *Synechocystis* 6803, in which the antibiotic resistance-conferring *neo* gene is utilized as a selectable marker.

FN15. 204 *Mol. Gen. Genet.* 185 (1986).

Reiss [FN16] studies expression in *E. coli* of various proteins formed by fusion of certain foreign DNA sequences with the *neo* gene.

FN16. 30 *Gene* 211 (1984).

Kolowsky [FN17] discloses chimeric plasmids designed for transformation of the cyanobacterium *Synechococcus* R2, comprising an antibiotic-resistant gene linked to chromosomal DNA from the *Synechococcus* cyanobacterium.

FN17. 27 *Gene* 289 (1984).

Barnes, United States Patent No. 4,695,455, is directed to the treatment with stabilizing chemical reagents of pesticides produced by expression of heterologous genes (such as those encoding *Bacillus* proteins) in host microbial cells such as *Pseudomonas* bacteria. The host cells are killed by this treatment, but the resulting pesticidal compositions exhibit prolonged toxic activity when exposed to the environment of target pests.

*492 D. The Grounds of Rejection

1. The § 103 Rejections

Claims 1-6, 16-21, 33-38, 47-48 and 52 (which include all independent claims in the application) were rejected as unpatentable under 35 U.S.C. § 103 based upon Dzelzkalns in view of Sekar I or Sekar II and Ganesan. The examiner stated that Dzelzkalns discloses a chimeric gene capable of

being highly expressed in a cyanobacterium, said gene comprising a promoter region effective for expression in a cyanobacterium operably linked to a structural gene encoding CAT. The examiner acknowledged that the chimeric gene and transformed host of Dzelzkalns differ from the claimed invention in that the former's structural gene encodes CAT rather than insecticidally active protein. However, the examiner pointed out, Sekar I, Sekar II, and Ganesan teach genes encoding insecticidally active proteins produced by *Bacillus*, and the advantages of expressing such genes in heterologous [FN18] hosts to obtain larger quantities of the protein. The examiner contended that it would have been obvious to one of ordinary skill in the art to substitute the *Bacillus* genes taught by Sekar I, Sekar II, and Ganesan for the CAT gene in the vectors of Dzelzkalns in order to obtain high level expression of the *Bacillus* genes in the transformed cyanobacteria. The examiner further contended that it would have been obvious to use cyanobacteria as heterologous hosts for expression of the claimed genes due to the ability of cyanobacteria to serve as transformed hosts for the expression of heterologous genes. In the absence of evidence to the contrary, the examiner contended, the invention as a whole was *prima facie* obvious.

FN18. Denotes different species or organism.

Additional rejections were entered against various groups of dependent claims which we need not address here. All additional rejections were made in view of Dzelzkalns in combination with Sekar I, Sekar II, and Ganesan, and further in view of other references discussed in Part C above.

The Board affirmed the § 103 rejections, basically adopting the examiner's Answer as its opinion while adding a few comments. The legal conclusion of obviousness does not require absolute certainty, the Board added, but only a reasonable expectation of success, citing *In re O'Farrell*, 853 F.2d 894, 7 U.S.P.Q.2d 1673 (Fed.Cir.1988). In view of the disclosures of the prior art, the Board concluded, one of ordinary skill in the art would have been motivated by a reasonable expectation of success to make the substitution suggested by the examiner.

2. The § 112 Rejection

The examiner also rejected claims 1-48 and 50-51 under 35 U.S.C. § 112, first paragraph, on the ground that the disclosure was enabling only for claims limited in accordance with the specification as filed. Citing *Manual of Patent Examining Procedure* (MPEP) provisions 706.03(n) [FN19] and (z) [FN20] as support, the examiner took the position that undue experimentation would be required of the art worker to practice the claimed invention, in view of the unpredictability in the art, the breadth of the claims, the limited number of working examples and the limited guidance provided *493 in the specification. With respect to unpredictability, the examiner stated that

FN19. MPEP 706.03(n), "Correspondence of Claim and Disclosure," provides in part:

In chemical cases, a claim may be so broad as to not be supported by [the] disclosure, in which case it is rejected as unwarranted by the disclosure....

FN20. MPEP 706.03(z), "Undue Breadth," provides in part:

[I]n applications directed to inventions in arts where the results are unpredictable, the disclosure of a single species usually does not provide an adequate basis to support generic claims. *In re Sol*, 1938 C.D. 723; 497 O.G. 546. This is because in arts such as chemistry it is not obvious from the disclosure of one species, what other species will work. *In re Dreshfield*, 1940 C.D. 351; 518 O.G. 255 gives this general rule: "It is well settled that in cases involving chemicals and chemical compounds, which differ radically in their properties it must appear in an applicant's specification either by the enumeration of a sufficient number of the members of a group or by other appropriate language, that the chemicals or chemical combinations included in the claims are capable of accomplishing the desired result." ...

[t]he cyanobacteria comprise a large and diverse group of photosynthetic bacteria including large numbers of species in some 150 different genera including *Synechocystis*, *Anacystis*, *Synechococcus*, *Agmenellum*,

Nostoc, *Anabaena*, etc. The molecular biology of these organisms has only recently become the subject of intensive investigation and this work is limited to a few genera. Therefore the level of unpredictability regarding heterologous gene expression in this large, diverse and relatively poorly studied group of procaryotes is high....

The Board affirmed, noting that "the limited guidance in the specification, considered in light of the relatively high degree of unpredictability in this particular art, would not have enabled one having ordinary skill in the art to practice the broad scope of the claimed invention without undue experimentation. In re Fisher, 427 F.2d 833, 166 U.S.P.Q. 18 (CCPA 1970)."

OPINION

A. Obviousness

[1] We first address whether the PTO erred in rejecting the claims on appeal as prima facie obvious within the meaning of 35 U.S.C. § 103. Obviousness is a legal question which this court independently reviews, though based upon underlying factual findings which we review under the clearly erroneous standard. In re Woodruff, 919 F.2d 1575, 1577, 16 U.S.P.Q.2d 1934, 1935 (Fed.Cir.1990).

[2] Where claimed subject matter has been rejected as obvious in view of a combination of prior art references, a proper analysis under § 103 requires, *inter alia*, consideration of two factors: (1) whether the prior art would have suggested to those of ordinary skill in the art that they should make the claimed composition or device, or carry out the claimed process; and (2) whether the prior art would also have revealed that in so making or carrying out, those of ordinary skill would have a reasonable expectation of success. See In re Dow Chemical Co., 837 F.2d 469, 473, 5 U.S.P.Q.2d 1529, 1531 (Fed.Cir.1988). Both the suggestion and the reasonable expectation of success must be founded in the prior art, not in the applicant's disclosure. *Id.*

[3] We agree with appellants that the PTO has not established the prima facie obviousness of the claimed subject matter. The prior art simply does not disclose or suggest the expression in cyanobacteria of a chimeric gene encoding an insecticidally active protein, or convey to those

of ordinary skill a reasonable expectation of success in doing so. More particularly, there is no suggestion in Dzelzkalns, the primary reference cited against all claims, of substituting in the disclosed plasmid a structural gene encoding *Bacillus* insecticidal proteins for the CAT gene utilized for selection purposes. The expression of antibiotic resistance-conferring genes in cyanobacteria, without more, does not render obvious the expression of unrelated genes in cyanobacteria for unrelated purposes.

The PTO argues that the substitution of insecticidal *Bacillus* genes for CAT marker genes in cyanobacteria is suggested by the secondary references Sekar I, Sekar II, and Ganesan, which collectively disclose expression of genes encoding *Bacillus* insecticidal proteins in two species of host *Bacillus* bacteria (*B. megaterium* and *B. subtilis*) as well as in the bacterium *E. coli*. While these references disclose expression of *Bacillus* genes encoding insecticidal proteins in certain transformed bacterial hosts, nowhere do these references disclose or suggest expression of such genes in transformed cyanobacterial hosts.

To remedy this deficiency, the PTO emphasizes similarity between bacteria and cyanobacteria, namely, that these are both procaryotic organisms, and argues that this fact would suggest to those of ordinary skill the use of cyanobacteria as hosts for expression of the claimed chimeric genes. While it is true that bacteria and cyanobacteria are now both classified as procaryotes, that fact alone is not sufficient to motivate the art worker as the PTO contends. *494 As the PTO concedes, cyanobacteria and bacteria are not identical; they are classified as two separate divisions of the kingdom Procaryotae. [FN21] Moreover, it is only in recent years that the biology of cyanobacteria has been clarified, as evidenced by references in the prior art to "blue-green algae." Such evidence of recent uncertainty regarding the biology of cyanobacteria tends to rebut, rather than support, the PTO's position that one would consider the cyanobacteria effectively interchangeable with bacteria as hosts for expression of the claimed gene.

[FN21] *Stedman's Medical Dictionary* 1139 (24th ed. 1982) (definition of "Procaryotae"). Procaryotic organisms are commonly classified according to the following taxonomic hierarchy: Kingdom;

Division; Class; Order; Family; Genus; Species. 3
Bergey's Manual of Systematic Bacteriology 1601
 (1989).

At oral argument the PTO referred to additional secondary references, not cited against any independent claim (i.e., Friedberg, Miller, and Nierzwicki-Bauer), which it contended disclose certain amino acid sequence homology between bacteria and cyanobacteria. The PTO argued that such homology is a further suggestion to one of ordinary skill to attempt the claimed invention. We disagree. As with the Dzelzkalns, Sekar I, Sekar II, and Ganesan references discussed above, none of these additional references disclose or suggest that cyanobacteria could serve as hosts for expression of genes encoding *Bacillus* insecticidal proteins. In fact, these additional references suggest as much about *differences* between cyanobacteria and bacteria as they do about similarities. For example, Nierzwicki-Bauer reports that a certain nucleotide sequence (i.e., the -10 consensus sequence) in a particular cyanobacterium resembles an *E. coli* promoter, but that another nearby nucleotide sequence (the -35 region) does not. While Miller speaks of certain promoters of the bacteriophage Lambda that are recognized by both cyanobacterial and *E. coli* RNA polymerases, it also discloses that these promoters exhibited differing strengths when exposed to the different polymerases. Differing sensitivities of the respective polymerases to an inhibitor are also disclosed, suggesting differences in the structures of the initiation complexes.

The PTO asks us to agree that the prior art would lead those of ordinary skill to conclude that cyanobacteria are attractive hosts for expression of any and all heterologous genes. Again, we can not. The relevant prior art does indicate that cyanobacteria are attractive hosts for expression of both native and heterologous *genes involved in photosynthesis* (not surprisingly, for the capability of undergoing oxygenic photosynthesis is what makes the cyanobacteria unique among procaryotes). However, these references do not suggest that cyanobacteria would be equally attractive hosts for expression of *unrelated* heterologous genes, such as the claimed genes encoding *Bacillus* insecticidal proteins.

In *O'Farrell*, this court affirmed an obviousness rejection of

a claim to a method for producing a "predetermined protein in a stable form" in a transformed bacterial host. 853 F.2d at 895, 7 U.S.P.Q.2d at 1674. The cited references included a prior art publication (the Polisky reference) whose three authors included two of the three coinventor-appellants. The main difference between the prior art and the claim at issue was that in Polisky, the heterologous gene was a gene for ribosomal RNA, while the claimed invention substituted a gene coding for a predetermined protein. Id. at 901, 7 U.S.P.Q.2d at 1679. Although, as the appellants therein pointed out, the ribosomal RNA gene is not normally translated into protein, Polisky mentioned preliminary evidence that the transcript of the ribosomal RNA gene was translated into protein, and further predicted that if a gene coding for a protein were to be substituted, extensive translation might result. *Id.* We thus affirmed, explaining that

the prior art explicitly suggested the substitution that is the difference between the claimed invention and the prior art, and presented preliminary evidence suggesting that the [claimed] method could be used to make proteins.

....

*495 ... Polisky contained detailed enabling methodology for practicing the claimed invention, a suggestion to modify the prior art to practice the claimed invention, and evidence suggesting that it would be successful.

Id. at 901-02, 7 U.S.P.Q.2d at 1679-80.

In contrast with the situation in *O'Farrell*, the prior art in this case offers no suggestion, explicit or implicit, of the substitution that is the difference between the claimed invention and the prior art. Moreover, the "reasonable expectation of success" that was present in *O'Farrell* is not present here. Accordingly, we reverse the § 103 rejections.

B. Enablement

[4] The first paragraph of 35 U.S.C. § 112 requires, *inter alia*, that the specification of a patent enable any person skilled in the art to which it pertains to make and use the claimed invention. Although the statute does not say so, enablement requires that the specification teach those in the art to make and use the invention without "undue experimentation." *In re Wands*, 858 F.2d 731, 737, 8 U.S.P.Q.2d 1400, 1404 (Fed.Cir.1988). That *some*

experimentation may be required is not fatal; the issue is whether the amount of experimentation required is "undue." *Id.* at 736-37, 8 U.S.P.Q.2d at 1404. Enablement, like obviousness, is a question of law which we independently review, although based upon underlying factual findings which we review for clear error. *See id.* at 735, 8 U.S.P.Q.2d at 1402.

[5] In response to the § 112 rejection, appellants assert that their invention is "pioneering," and that this should entitle them to claims of broad scope. Narrower claims would provide no real protection, appellants argue, because the level of skill in this art is so high, art workers could easily avoid the claims. Given the disclosure in their specification, appellants contend that any skilled microbiologist could construct vectors and transform many different cyanobacteria, using a variety of promoters and *Bacillus* DNA, and could easily determine whether or not the active *Bacillus* protein was successfully expressed by the cyanobacteria.

The PTO made no finding on whether the claimed invention is indeed "pioneering," and we need not address the issue here. With the exception of claims 47 and 48, the claims rejected under § 112 are not limited to any particular genus or species of cyanobacteria. The PTO's position is that the cyanobacteria are a diverse and relatively poorly studied group of organisms, comprising some 150 different genera, and that heterologous gene expression in cyanobacteria is "unpredictable." Appellants have not effectively disputed these assertions. Moreover, we note that only one particular species of cyanobacteria is employed in the working examples of appellants' specification, and only nine genera of cyanobacteria are mentioned in the entire document.

Taking into account the relatively incomplete understanding of the biology of cyanobacteria as of appellants' filing date, as well as the limited disclosure by appellants of particular cyanobacterial genera operative in the claimed invention, we are not persuaded that the PTO erred in rejecting claims 1-46 and 50-51 under § 112, first paragraph. There is no reasonable correlation between the narrow disclosure in appellants' specification and the broad scope of protection sought in the claims encompassing gene expression in any and all cyanobacteria. *See In re Fisher*, 427 F.2d 833, 839,

166 U.S.P.Q. 18, 24 (CCPA 1970) (the first paragraph of § 112 requires that the scope of the claims must bear a reasonable correlation to the scope of enablement provided by the specification). [FN22] Accordingly, *496 we affirm the § 112 rejection as to those claims.

[FN22. The enablement rejection in this case was not based upon a post-filing date state of the art, as in *In re Hogan*, 559 F.2d 595, 605-07, 194 U.S.P.Q. 527, 536-38 (CCPA 1977). *See also United States Steel Corp. v. Phillips Petroleum Co.*, 865 F.2d 1247, 1251, 9 U.S.P.Q.2d 1461, 1464 (Fed.Cir.1989) (citing *Hogan*); *Hormone Research Found., Inc. v. Genentech, Inc.*, 904 F.2d 1558, 1568-69, 15 U.S.P.Q.2d 1039, 1047-48 (Fed.Cir.1990) (directing district court, on remand, to consider effect of *Hogan* and *United States Steel* on the enablement analysis of *Fisher*), *cert. dismissed*, 499 U.S. 955, 111 S.Ct. 1434, 113 L.Ed.2d 485 (1991). We therefore do not consider the effect of *Hogan* and its progeny on *Fisher's* analysis of when an inventor should be allowed to "dominate the future patentable inventions of others." *Fisher*, 427 F.2d at 839, 166 U.S.P.Q. at 24.

[6] In so doing we do *not* imply that patent applicants in art areas currently denominated as "unpredictable" must never be allowed generic claims encompassing more than the particular species disclosed in their specification. It is well settled that patent applicants are not required to disclose every species encompassed by their claims, even in an unpredictable art. *In re Angstadt*, 537 F.2d 498, 502-03, 190 U.S.P.Q. 214, 218 (CCPA 1976). However, there must be sufficient disclosure, either through illustrative examples or terminology, [FN23] to teach those of ordinary skill how to make and how to use the invention as broadly as it is claimed. This means that the disclosure must adequately guide the art worker to determine, without undue experimentation, which species among all those encompassed by the claimed genus possess the disclosed utility. Where, as here, a claimed genus represents a diverse and relatively poorly understood group of microorganisms, the required level of disclosure will be greater than, for

example, the disclosure of an invention involving a "predictable" factor such as a mechanical or electrical element. See *Fisher*, 427 F.2d at 839, 166 U.S.P.Q. at 24. In this case, we agree with the PTO that appellants' limited disclosure does not enable one of ordinary skill to make and use the invention as now recited in claims 1-46 and 50-51 without undue experimentation.

FN23. The first paragraph of § 112 requires nothing more than *objective* enablement. *In re Marzocchi*, 439 F.2d 220, 223, 169 U.S.P.Q. 367, 369 (CCPA 1971). How such a teaching is set forth, either by the use of illustrative examples or by broad terminology, is irrelevant. *Id.*

Remaining dependent claim 47 recites a cyanobacterium which expresses the chimeric gene of claim 1, wherein the cyanobacterium is selected from among the genera *Anacystis* and *Synechocystis*. Claim 48, which depends from claim 47, is limited to the cyanobacterium *Synechocystis* 6803. The PTO did not separately address these claims, nor indicate why they should be treated in the same manner as the claims encompassing all types of cyanobacteria. Although these claims are not limited to expression of genes encoding particular *Bacillus* proteins, we note what appears to be an extensive understanding in the prior art of the numerous *Bacillus* proteins having toxicity to various insects. The rejection of claims 47-48 under § 112 will not be sustained.

CONCLUSION

The rejection of claims 1-48 and 50-52 under 35 U.S.C. § 103 is *reversed*. The rejection of claims 1-46 and 50-51 under 35 U.S.C. § 112, first paragraph, is *affirmed* and the rejection of claims 47 and 48 thereunder is *reversed*.

AFFIRMED-IN-PART, REVERSED-IN-PART.

MAYER, Circuit Judge, dissenting.

An appeal is not a second opportunity to try a case or prosecute a patent application, and we should not allow parties to "undertake to retry the entire case on appeal." *Perini America, Inc. v. Paper Converting Machine Co.*, 832 F.2d 581, 584, 4 U.S.P.Q.2d 1621, 1624 (Fed.Cir.1987);

Eaton Corp. v. Appliance Valves Corp., 790 F.2d 874, 877, 229 U.S.P.Q. 668, 671 (Fed.Cir.1986). But that is precisely what the court has permitted here. The PTO conducted a thorough examination of the prior art surrounding this patent application and concluded the claims would have been obvious. The board's decision based on the examiner's answer which comprehensively explains the rejection is persuasive and shows how the evidence supports the legal conclusion that the claims would have been obvious. Yet, the court ignores all this and conducts its own examination, if you will, as though the examiner and board did not exist. Even if I thought this opinion were more persuasive than the board's, I could *497 not join it because it misperceives the role of the court.

The scope and content of the prior art, the similarity between the prior art and the claims, the level of ordinary skill in the art, and what the prior art teaches are all questions of fact. *Graham v. John Deere Co.*, 383 U.S. 1, 17, 86 S.Ct. 684, 693-94, 15 L.Ed.2d 545, 148 U.S.P.Q. 459, 467 (1966); *Jurgens v. McKasy*, 927 F.2d 1552, 1560, 18 U.S.P.Q.2d 1031, 1037 (Fed.Cir.1991). And "[w]here there are two permissible views of the evidence, the factfinder's choice between them cannot be clearly erroneous." *Anderson v. City of Bessemer City*, 470 U.S. 564, 574, 105 S.Ct. 1504, 1511-12, 84 L.Ed.2d 518 (1985). The mere denomination of obviousness as a question of law does not give the court license to decide the factual matters afresh and ignore the requirement that they be respected unless clearly erroneous. *In re Woodruff*, 919 F.2d 1575, 1577, 16 U.S.P.Q.2d 1934, 1935 (Fed.Cir.1990); *In re Kulling*, 897 F.2d 1147, 1149, 14 U.S.P.Q.2d 1056, 1057 (Fed.Cir.1990). There may be more than one way to look at the prior art, but on this record we are bound by the PTO's interpretation of the evidence because it is not clearly erroneous and its conclusion is unassailable. I would affirm on that basis.

947 F.2d 488, 20 U.S.P.Q.2d 1438

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APPENDIX F

MEHL/BIOPHILE INTERNATIONAL CORP. V. MILGRAUM

Briefs and Other Related Documents

United States Court of Appeals,
Federal Circuit.

MEHL/BIOPHILE INTERNATIONAL CORP., Selvac
Acquisitions Corp. and Nardo Zaias,
M.D., Plaintiffs-Appellants,
v.

Sandy MILGRAUM, M.D., Palomar Medical Technologies,
Inc., and Spectrum Medical
Technologies, Inc., Defendants-Appellees.
No. 99-1038.

Sept. 30, 1999.

Rehearing Denied Oct. 27, 1999.

Patentee brought action for infringement of patent claiming method of hair removal using laser. The United States District Court for the District of New Jersey, Alfred M. Wolin, J., 8 F.Supp.2d 434, granted summary judgment of invalidity, and patentee appealed. The Court of Appeals, Rader, Circuit Judge, held that: (1) patent was not anticipated by instruction manual for laser used to remove tattoos, but (2) patent was anticipated by prior art article.

Affirmed.

West Headnotes

[1] Patents  **72(1)**291k72(1) Most Cited Cases

To anticipate a patent claim, a prior art reference must disclose every limitation of the claimed invention, either explicitly or inherently.

[2] Patents  **72(1)**291k72(1) Most Cited Cases

Under the principles of inherency, if the prior art necessarily functions in accordance with, or includes, the limitations claimed in a patent, it anticipates.

[3] Patents  **65**291k65 Most Cited Cases

Inherency of patent claim's limitations in a prior art reference, for anticipation purposes, is not necessarily

coterminous with the knowledge of those of ordinary skill in the art; artisans of ordinary skill may not recognize the inherent characteristics or functioning of the prior art.

[4] Patents  **67.1**291k67.1 Most Cited Cases

Patented method of removing hair by using a laser was not anticipated by instruction manual for laser used to remove tattoos, since manual did not include limitation of aligning laser over a hair follicle opening, and such alignment was not inherent in manual's disclosure, notwithstanding possibility of such alignment.

[5] Patents  **72(1)**291k72(1) Most Cited Cases

Occasional results are not inherent, for purpose of determining whether patent is anticipated by prior art alleged to inherently include claimed limitations.

[6] Federal Courts  **762**170Bk762 Most Cited Cases

Appellees always have the right to assert alternative grounds for affirming the judgment that are supported by the record.

[7] Patents  **70**291k70 Most Cited Cases

Patented method of removing hair by using a laser was anticipated by prior art article documenting study of tissue damage induced by laser pulses on epilated backs of guinea pigs, which showed that natural result flowing from the operation as taught would result in alignment of the laser light over a hair follicle, as claimed in the patent, notwithstanding fact that study involved guinea pigs or that article failed to mention hair depilation as a goal.

Patents  **328(2)**291k328(2) Most Cited Cases

5,059,192. Invalid.

***1363** Jeffrey A. Schwab, Abelman, Frayne & Schwab, of New York, New York, argued for plaintiffs-appellants. With him on the brief were Michael Aschen and Anthony J. DiFilippi. Of counsel on the brief was George A. Arkwright, Schlesinger, Arkwright & Garvey, LLP, of Arlington, Virginia.

Wayne L. Stoner, Hale and Dorr, LLP, of Boston, Massachusetts, argued for defendants-appellees. With him on the brief were William F. Lee and James M. Hall. Of counsel on the brief was Thomas A. Reed, Palomar Medical Technologies, Inc., of Lexington, Massachusetts.

Before MAYER, MICHEL, and RADER, Circuit Judges.

RADER, Circuit Judge.

In this patent infringement action, MEHL/Biophile International Corp., Selvac Acquisitions Corp., and Dr. Nardo Zaias (collectively, MEHL/Biophile) asserted that Dr. Sandy Milgraum, Palomar Medical Technologies, Inc., and Spectrum Medical Technologies, Inc. (Milgraum) infringed U.S. Patent No. 5,059,192 (the '192 patent). On its motion for summary judgment, Milgraum contended that all of the '192 patent claims were anticipated by an instruction manual for the Spectrum RD-1200 laser and by a 1987 Journal of Investigative Dermatology article authored by Dr. Luigi Polla and others (the Polla article). The district court agreed that the manual anticipated the claims, granted summary judgment of invalidity, and dismissed the action. See *1364 Mehl/Biophile Int'l Corp. v. Milgraum, 8 F.Supp.2d 434, 47 USPQ2d 1248 (D.N.J.1998). Although this court disagrees that the manual discloses all the elements of the claimed invention, because the Polla article does, this court affirms.

I.

The '192 patent, entitled "Method of Hair Depilation," claims a method for removing hair using a laser. Hairs grow out of hair follicles, tubular apertures in the skin. The collection of germ cells from which hairs grow, known as the papilla, lies at the base of the follicle. The '192 patent claims a method for destroying the papilla, thereby preventing hair regrowth. The written description discloses the use of a Q-switched ruby laser to effect the destruction.

At a meeting of the American Academy of Dermatology, Dr. Zaias visited Spectrum's booth where Spectrum displayed such a laser, known as the RD-1200. Spectrum sold the RD-1200 for use in removing tattoos. Dr. Zaias recognized that the same principles that govern laser absorption in skin pigmented by a tattoo would also focus

laser absorption on the natural skin pigment found in the papilla. More specifically, the papilla contains granules (called melanosomes) of a dark pigment (called melanin). A Q-switched ruby laser aimed at the hair follicle will penetrate the skin and reach the papillary melanin. At a particular wavelength, the laser will heat up and destroy the papilla without damaging surrounding tissue.

Claim 1 of the patent, the only independent claim, reads:

1. A method of hair depilation, comprising the steps of:
 - a) aligning a laser light applicator substantially vertically over a hair follicle opening, said applicator having an aperture of sufficient area to surround a hair follicle and overlie its papilla;
 - b) applying through said aperture to the hair follicle a pulse of laser energy of a wavelength which is readily absorbed by the melanin of the papilla and having a radiant exposure dose of sufficient energy and duration to damage its papilla so that hair regrowth is prevented and scarring of the surrounding skin is avoided.

Dependent claims 2-6 further specify parameters of the laser light applicator, energy delivery, and the type of laser.

MEHL/Biophile sued Milgraum in the United States District Court for the District of New Jersey for infringement of all the claims of the '192 patent. Milgraum moved for summary judgment of invalidity based on 35 U.S.C. § 102 (1994), arguing that two prior art references each teach all the limitations of the claims. As noted at the outset, Milgraum relied on the manual for the RD-1200 laser which describes the use of a laser to remove tattoos. The manual teaches the use of a Q-switched ruby laser to remove a tattoo: "[E]nergy is selectively absorbed only by pigmented chromophores and not surrounding tissue, greatly reducing the risk of scarring."

Milgraum also relied on the Polla article entitled "Melanosomes Are a Primary Target of Q-Switched Ruby Laser Irradiation in Guinea Pig Skin." The Polla article documents "the tissue damage induced by Q-switched ruby laser pulses in black, brown, and albino (control) guinea pigs ... in an effort to define the nature and extent of pigmented cell injury." The method involves epilating guinea pigs with soft wax, holding the aperture of the laser in contact with the skin, and pulsing the laser. Using an

electron microscope, the researchers observed "disruption of melanosomes deep in the hair papillae."

The district court considered both references, but ultimately rested its decision on the RD-1200 manual. MEHL/Biophile appeals. MEHL/Biophile makes several arguments for disregarding the manual as an anticipating reference. For instance, MEHL/Biophile argues that the manual does not teach use of the laser to remove hair at all. Further MEHL/Biophile contends that the manual does not disclose a substantially vertical alignment, a claim element. As for the Polla article, *1365 MEHL/Biophile argues that the reference relates to guinea pig skin and does not mention hair depilation. In addition, MEHL/Biophile contends that the epilation of the guinea pig backs removed the papilla so the laser treatment could not have damaged the papilla.

II.

This court reviews a district court's grant of summary judgment by reapplying the standard applicable at the district court. See Conroy v. Reebok Int'l. Ltd., 14 F.3d 1570, 1575, 29 USPQ2d 1373, 1377 (Fed.Cir.1994). Summary judgment is appropriate only when "there is no genuine issue as to any material fact and ... the moving party is entitled to a judgment as a matter of law." Fed.R.Civ.P. 56(c). In its review, this court draws all reasonable inferences in favor of the non-movant. See Anderson v. Liberty Lobby, Inc., 477 U.S. 242, 255, 106 S.Ct. 2505, 91 L.Ed.2d 202 (1986).

[1][2][3] "To anticipate a claim, a prior art reference must disclose every limitation of the claimed invention, either explicitly or inherently." In re Schreiber, 128 F.3d 1473, 1477, 44 USPQ2d 1429, 1431 (Fed.Cir.1997). As this court's predecessor stated in In re Oelrich, 666 F.2d 578, 581, 212 USPQ 323, 326 (CCPA 1981) (quoting Hansgirk v. Kemmer, 26 C.C.P.A. 937, 102 F.2d 212, 214, 40 USPQ 665, 667 (1939)) (internal citations omitted):

Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient. If, however, the disclosure is sufficient to show that the natural result flowing from the operation as taught would result in the performance of the questioned function, it seems to be well settled that the disclosure

should be regarded as sufficient.

Thus, a prior art reference may anticipate when the claim limitation or limitations not expressly found in that reference are nonetheless inherent in it. See In re Oelrich, 666 F.2d at 581; Verdegaal Bros., Inc. v. Union Oil Co. of Cal., 814 F.2d 628, 630, 2 USPQ2d 1051, 1053 (Fed.Cir.1987). Under the principles of inherency, if the prior art necessarily functions in accordance with, or includes, the claimed limitations, it anticipates. See In re King, 801 F.2d 1324, 1326, 231 USPQ 136, 138 (Fed.Cir.1986). Inherency is not necessarily coterminous with the knowledge of those of ordinary skill in the art. Artisans of ordinary skill may not recognize the inherent characteristics or functioning of the prior art. See id., 801 F.2d at 1326.

The RD-1200 Manual

[4] The RD-1200 manual cannot anticipate because it does not teach all the limitations of the claimed invention. Claim 1 includes the step of "aligning a laser light applicator substantially vertically over a hair follicle opening." The parties agree that the manual does not discuss hair follicles, let alone aligning the laser over a hair follicle opening. Thus, the manual does not explicitly teach alignment substantially vertically over a follicle opening. Without explicit teachings of this claim limitation, this court must nonetheless examine whether such alignment is inherent in the manual's disclosure.

[5] The manual teaches aiming the laser at skin pigmented with tattoo ink. The record discloses no necessary relationship between the location of a tattoo and the location of hair follicles. Therefore, an operator of the RD-1200 laser could use the laser according to the manual without necessarily aligning the laser "substantially vertically over a hair follicle opening." The possibility of such an alignment does not legally suffice to show anticipation. See In re Oelrich, 666 F.2d at 581. Occasional results are not inherent. Because this court holds that the manual does not inherently teach this limitation of the claimed invention, it does not address MEHL/Biophile's other arguments. To anticipate, a single reference must teach every limitation of the claimed invention. Without an inherent teaching about alignment, the manual does not anticipate the claimed

invention.

***1366 The Polla Article**

[6] Although the district court did not reach the Polla article in its anticipation analysis, "[a]ppellees always have the right to assert alternative grounds for affirming the judgment that are supported by the record." Datascope Corp. v. SMEC, Inc., 879 F.2d 820, 822 n. 1, 11 USPO2d 1321, 1322 n. 1 (Fed.Cir.1989). Milgraum asserts that the Polla article constitutes such an alternative ground. This court agrees.

[7] As to the "aligning" step, the Polla article does not suffer from the same deficiency as the manual. It is not a question of probabilities as to whether a person of ordinary skill following the teachings of the article will align the laser light applicator over a hair follicle. The researchers focused their study on the epilated backs of guinea pigs. No one disputes that guinea pigs have hairy backs. Indeed, the article itself is replete with references to the irradiation of hair follicles and resulting follicular damage:

At 0.8 J/cm², epidermal lesions were more marked and involved hair follicles 0.3 mm below the skin surface....

[L]esions were also present 0.5 mm deep in follicles.

[E]ven at the highest radiant exposure (1.2 J/cm²), brown [guinea pig] skin never showed full-thickness epidermal necrosis and at 0.8 J/cm², follicular damage was observed to a depth of 0.5 mm and at 1.2 J/cm² to a depth of 0.7 mm below the skin surface.

Follicular changes were similar in nature and extent to the epidermal alterations described above, and were associated with melanosome disruption.

Specifically, we have shown that ... pigmented structures in the deep dermis such as hair follicles are affected....

The article further contains a photograph showing "[f]ollicular changes induced by ruby laser." The changes include disruption of "melanosomes contained within follicular epithelium." Moreover the article specifically mentioned disruption of the hair papillae:

At 0.8 and 1.2 J/cm², individual melanosomes were more intensely damaged and disruption of melanosomes deep

in the hair papillae was observed.

Finally, the method of exposing the Q-switched ruby laser to the guinea pig skin also inherently teaches substantially vertical alignment over hair follicle openings:

The collimated laser beam struck a circular aperture, 2.5 mm in diameter, held in contact with the skin of the animals.

The record shows that holding the collimated laser in contact with the skin would align it perpendicular to the skin surface and therefore substantially vertically over follicle openings. Viewed as a whole, this disclosure shows, in the words of In re Oelrich, 666 F.2d at 581, that the "natural result flowing from the operation as taught would result in" alignment of the laser light over a hair follicle, as claimed. No reasonable jury could find otherwise.

MEHL/Biophile's remaining arguments concerning the Polla article are unavailing. The Polla article concerns itself with guinea pig, rather than human, skin, but that difference is irrelevant to the anticipation analysis. Nothing in the claim limits the method's reach to human skin. Similarly, the Polla article's failure to mention hair depilation as a goal is similarly irrelevant. MEHL/Biophile does not dispute on appeal that the laser operating parameters disclosed in the article substantially coincide with those disclosed in the patent. Accordingly, to the extent the embodiment in the patent achieves hair depilation, so does the Polla method. Where, as here, the result is a necessary consequence of what was deliberately intended, it is of no import that the article's authors did not appreciate the results. See W.L. Gore & Assocs. v. Garlock, Inc., 721 F.2d 1540, 1548, 220 USPO 303, 309 (Fed.Cir.1983). Finally, as mentioned earlier, the article itself belies MEHL/Biophile's argument that the wax epilation prescribed by the article resulted in removal of the papilla. *1367 The article specifically states that "disruption of melanosomes deep in the hair papillae was observed." MEHL/Biophile's expert testimony contradicting the plain language of the reference does not create a genuine issue of fact.

Thus, the Polla article anticipates claim 1 of the '192 patent. Because MEHL/Biophile has not separately argued the validity of the dependent claims, the judgment of invalidity as to those claims also stands.

COSTS

Each party shall bear its own costs.

AFFIRMED

192 F.3d 1362, 52 U.S.P.Q.2d 1303

Briefs and Other Related Documents ([Back to top](#))

- [1999 WL 33918087](#) (Appellate Petition, Motion and Filing) Petition for Rehearing (Oct. 14, 1999)Original Image of this Document with Appendix (PDF)
- [1999 WL 33614426](#) (Appellate Brief) Reply Brief of Plaintiffs-Appellants (Apr. 06, 1999)Original Image of this Document (PDF)
- [1999 WL 33614425](#) (Appellate Brief) Brief of Defendants-Appellees (Mar. 01, 1999)Original Image of this Document (PDF)
- [99-1038](#) (Docket) (Oct. 29, 1998)
- [1998 WL 34082809](#) (Appellate Brief) Brief of Plaintiffs-Appellants (Jan. 04, 1998)Original Image of this Document with Appendix (PDF)

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APPENDIX G
IN RE DEMBICZAK

Briefs and Other Related Documents

United States Court of Appeals,
Federal Circuit.

In re Anita DEMBICZAK and Benson Zinbarg, Appellants.
No. 98-1498.

April 28, 1999.

Board of Patent Appeals and Interferences upheld rejection of application for utility patent, and appeal was taken. The United States Court of Appeals for the Federal Circuit, Clevenger, Circuit Judge, held that: (1) Board erred by rejecting application for patent on plastic trash bags with pumpkin face on grounds of obviousness, without finding suggestion, teaching, or motivation to combine prior art references, and (2) applicant's earlier design patents involving pumpkin faces on bags did not preclude issuance of patent in present case, under obviousness-type double patenting doctrine.

Reversed.

West Headnotes

[1] Patents  **113(6)**291k113(6) Most Cited Cases

Federal Circuit determines legal question of obviousness of patent without deference to Board of Patent Appeals and Interferences, and examines any factual findings for clear error. 35 U.S.C.A. § 103(a).

[2] Patents  **16(1)**291k16(1) Most Cited Cases

Measuring a claimed invention for obviousness requires the oft-difficult but critical step of casting the mind back to the time of invention, to consider the thinking of one of ordinary skill in the art, guided only by the prior art references and the then-accepted wisdom in the field. 35 U.S.C.A. § 103(a).

[3] Patents  **16(4)**291k16(4) Most Cited Cases

Best defense against the subtle but powerful attraction of a hindsight-based obviousness analysis of a patent application

is rigorous application of the requirement for a showing of the teaching or motivation to combine prior art references. 35 U.S.C.A. § 103(a).

[4] Patents  **26(1)**291k26(1) Most Cited Cases

Evidence of a suggestion, teaching, or motivation to combine prior art references, sufficient to render invention obvious and unpatentable, may flow from the prior art references themselves, the knowledge of one of ordinary skill in the art, or, in some cases, from the nature of the problem to be solved. 35 U.S.C.A. § 103(a).

[5] Patents  **36(1)**291k36(1) Most Cited Cases

Broad conclusory statements regarding the teaching of multiple references, standing alone, are not evidence sufficient to render invention obvious and unpatentable. 35 U.S.C.A. § 103(a).

[6] Patents  **16.27**291k16.27 Most Cited Cases

Board of Patent Appeals and Interferences erred by denying for obviousness

application for utility patent for orange colored plastic trash bag with markings, which expanded to show face of pumpkin when filled with leaves, when Board cited prior art showing placement of pumpkin faces on crepe paper and which disclosed features of plastic trash bags and concluded that prior art references collectively described all limitations of present claims; Board should have found a suggestion, teaching, or motivation to combine prior art references. 35 U.S.C.A. § 103(a).

[7] Patents  **113(6)**291k113(6) Most Cited Cases

Federal Circuit would not consider argument made in support of obviousness of patent application, which was not raised before Board of Patent Appeals and Interferences. 35 U.S.C.A. § 103(a).

[8] Patents  **120**291k120 Most Cited Cases

The doctrine of "obviousness-type double patenting" prohibits claims in a second patent which define merely an obvious variation of an invention claimed by the same

175 F.3d 994

175 F.3d 994, 50 U.S.P.Q.2d 1614

(Cite as: 175 F.3d 994)

inventor in an earlier patent. 35 U.S.C.A. § 103(a).

[9] Patents  **314(5)**

291k314(5) Most Cited Cases

Question whether patent application is to be rejected, under obvious-type double patenting doctrine, on grounds that claimed invention was merely an obvious variation on invention disclosed in existing patent, is one of law, which Federal Circuit reviews de novo. 35 U.S.C.A. § 103(a).

[10] Patents  **120**

291k120 Most Cited Cases

In some very rare cases, obvious-type double patenting, in which invention claimed in patent application was obvious variation on invention disclosed by existing patent, may be found between design and utility patents. 35 U.S.C.A. § 103(a).

[11] Patents  **120**

291k120 Most Cited Cases

When utility patent is sought to be invalidated due to obviousness, in light of previous design patents, rejection under obviousness-type double patenting doctrine is appropriate only if the claims of the two patents cross-read, meaning that the test is whether the subject matter of the claims of the patent sought to be invalidated would have been obvious from the subject matter of the claims of the other patent, and vice versa. 35 U.S.C.A. § 103(a).

[12] Patents  **28**

291k28 Most Cited Cases

In order for a design to be unpatentable because of obviousness, there must first be a basic design reference in the prior art, the design characteristics of which are basically the same as the claimed design. 35 U.S.C.A. § 103(a).

[13] Patents  **120**

291k120 Most Cited Cases

Phrase "having facial indicia thereon," contained in claim of application for utility patent on plastic trash bag with pumpkin face, was not design reference that was basically the same as claimed design covered by design patents on jack-o-lantern faces on bags, and application was consequently not required to be rejected under obviousness-type double patenting doctrine. 35 U.S.C.A. §

103(a).

*996 David P. Gordon, of Stamford, Connecticut, argued for appellant. Of counsel was Thomas A. Gallagher, of Stamford, Connecticut.

John M. Whealan, Associate Solicitor, Office of the Solicitor, of Arlington, Virginia, argued for appellee. With him on the brief were Albin F. Drost, Acting Solicitor, and David R. Nicholson, Associate Solicitor.

Before MAYER, Chief Judge, MICHEL and CLEVINGER, Circuit Judges.

CLEVINGER, Circuit Judge.

Anita Dembiczak and Benson Zinbarg appeal the rejection, upheld by the Board of Patent Appeals and Interferences, of all pending claims in their Application No. 08/427,732. *See Ex Parte Dembiczak*, No. 96-2648, slip op. at 43 (May 14, 1998). Because the Board erred in sustaining rejections of the pending claims as obvious under 35 U.S.C. § 103(a) (*Supp.1998*), and for obviousness-type double patenting, we reverse.

I

The invention at issue in this case is, generally speaking, a large trash bag made of orange plastic and decorated with lines and facial features, allowing the bag, when filled with trash or leaves, to resemble a Halloween-style pumpkin, or jack-o'-lantern. As the inventors, Anita Dembiczak and Benson Zinbarg (collectively, "Dembiczak") note, the invention solves the long-standing problem of unsightly trash bags placed on the curbs of America, and, by fortuitous happenstance, allows users to express their whimsical or festive nature while properly storing garbage, leaves, or other household debris awaiting collection. Embodiments of the invention--sold under a variety of names, including Giant Stuff-A-Pumpkin, Funkins, Jack Sak, and Bag-O-Fun--have undisputedly been well-received by consumers, who bought more than seven million units in 1990 alone. Indeed, in 1990, the popularity of the pumpkin bags engendered a rash of thefts around Houston, Texas, leading some owners to resort to preventative measures, such as greasing the bags with petroleum jelly and tying them to trees. *See* R. Piller, "Halloween Hopes Die on the

Vine," *Hous. Chron.*, Oct. 19, 1990, at 13A.

The road to profits has proved much easier than the path to patentability, however. In July 1989, Dembiczak filed a utility patent application generally directed to the pumpkin bags. In a February 1992 appeal, the Board of Patent Appeals and Interferences ("the Board") reversed the Examiner's rejection, but entered new grounds for rejection. Dembiczak elected to continue prosecution, filing a continuation application to address the new grounds for rejection. Thereafter, the invention made a second appearance before the Board, in April 1993, when the Board both sustained the Examiner's rejection and again entered new grounds for rejection. Again, a continuation application was filed (the instant application). And again the Examiner's rejection was appealed to the Board, which sustained the rejection in a May 14, 1998, decision. *See Dembiczak*, slip op. at 43.

A

The patent application at issue includes claims directed to various embodiments of *997 the pumpkin bag. Claims 37, 49, 51, 52, 58 through 64, 66 through 69, and 72 through 81 are at issue in this appeal. Though the claims vary, independent claim 74 is perhaps most representative:

74. A decorative bag for use by a user with trash filling material, the bag simulating the general outer appearance of an outer surface of a pumpkin having facial indicia thereon, comprising:

a flexible waterproof plastic trash or leaf bag having an outer surface which is premanufactured orange in color for the user to simulate the general appearance of the outer skin of a pumpkin, and having facial indicia including at least two of an eye, a nose and a mouth on the orange color outer surface for forming a face pattern on said orange color outer surface to simulate the general outer appearance of a decorative pumpkin with a face thereon,

said trash or leaf bag having first and second opposite ends, at least said second end having an opening extending substantially across the full width of said trash or leaf bag for receiving the trash filling material, wherein when said trash or leaf bag is filled with trash filling material and closed, said trash or leaf bag takes the

form and general appearance of a pumpkin with a face thereon.

All of the independent claims on appeal, namely 37, 52, 72, and 74, contain limitations that the bag must be "premanufactured orange in color," have "facial indicia," have openings suitable for filling with trash material, and that when filled, the bag must have a generally rounded appearance, like a pumpkin. Independent claims 37, 52, and 72 add the limitation that the bag's height must at least 36 inches. Claim 72 requires that the bag be made of a "weatherproof material," and claim 74, as shown above, requires that the bag be "waterproof." Claim 52 recites a "method of assembling" a bag with the general characteristics of apparatus claim 37.

B

The prior art cited by the Board includes:

- (1) pages 24-25 of a book entitled "A Handbook for Teachers of Elementary Art," by Holiday Art Activities ("Holiday"), describing how to teach children to make a "Crepe Paper Jack-O-Lantern" out of a strip of orange crepe paper, construction paper cut-outs in the shape of facial features, and "wadded newspapers" as filling;
- (2) page 73 of a book entitled "The Everything Book for Teachers of Young Children," by Martha Shapiro and Valerie Indenbaum ("Shapiro"), describing a method of making a "paper bag pumpkin" by stuffing a bag with newspapers, painting it orange, and then painting on facial features with black paint;
- (3) U.S. Patent No. 3,349,991 to Leonard Kessler, entitled "Flexible Container" ("Kessler"), describing a bag apparatus wherein the bag closure is accomplished by the use of folds or gussets in the bag material;
- (4) U.S. Patent No. Des. 310,023, issued August 21, 1990 to Dembiczak ("Dembiczak '023"), a design patent depicting a bag with a jack-o'-lantern face;
- (5) U.S. Patent No. Des. 317,254, issued June 4, 1991 to Dembiczak ("Dembiczak '254"), a design patent depicting a bag with a jack-o'-lantern face; and,
- (6) Prior art "conventional" plastic lawn or trash bags ("the conventional trash bags").

Using this art, the Board affirmed the Examiner's final rejection of all the independent claims (37, 52, 72, 74) under

*99835 U.S.C. § 103, holding that they would have been obvious in light of the conventional trash bags in view of the Holiday and Shapiro references. The Board determined that, in its view of the prior art, "the only difference between the invention presently defined in the independent claims on appeal and the orange plastic trash bags of the prior art and the use of such bags resides in the application of the facial indicia to the outer surface of the bag." *Dembiczak*, slip op. at 18. The Board further held that the missing facial indicia elements were provided by the Holiday and Shapiro references' description of painting jack-o'-lantern faces on paper bags. *See id.* at 18-19. Dependent claims 49 and 79, which include a "gussets" limitation, were considered obvious under similar reasoning, except that the references cited against them included Kessler. *See id.* at 7.

The Board also affirmed the Examiner's obviousness-type double patenting rejection of all the independent claims in light of the two *Dembiczak* design patents ('023 and '254) and Holiday. *See id.* at 12. The Board held that the design patents depict a generally rounded bag with jack-o'-lantern facial indicia, and that the Holiday reference supplies the missing limitations, such as the "thin, flexible material" of manufacture, the orange color, the initially-open upper end, and the trash filling material. The Board also stated that the various limitations of the dependent claims--e.g., color, the inclusion of leaves as stuffing, and the dimensions--would all be obvious variations of the depictions in the *Dembiczak* design patents. *See id.* at 8-9. In addition, using a two-way test for obviousness-type double patenting, the Board held that the claims of the *Dembiczak* design patents "do not exclude" the additional structural limitations of the pending utility claims, and thus the design patents were merely obvious variations of the subject matter disclosed in the utility claims. *See id.* at 11. The Board further upheld, on similar grounds and with the inclusion of the Kessler reference, the obviousness-type double patenting rejection of dependent claim 49. *See id.* at 12.

This appeal followed, vesting this court with jurisdiction pursuant to 28 U.S.C. § 1295(a)(4)(A) (1994).

II

[1] A claimed invention is unpatentable if the differences between it and the prior art "are such that the subject matter

as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art." 35 U.S.C. § 103(a) (Supp.1998); *see Graham v. John Deere Co.*, 383 U.S. 1, 14, 86 S.Ct. 684, 15 L.Ed.2d 545, 148 USPO 459, 465 (1966). The ultimate determination of whether an invention is or is not obvious is a legal conclusion based on underlying factual inquiries including: (1) the scope and content of the prior art; (2) the level of ordinary skill in the prior art; (3) the differences between the claimed invention and the prior art; and (4) objective evidence of nonobviousness. *See Graham*, 383 U.S. at 17-18, 86 S.Ct. 684, 15 L.Ed.2d 545, 148 USPO at 467; *Miles Labs., Inc. v. Shandon Inc.*, 997 F.2d 870, 877, 27 USPO2d 1123, 1128 (Fed.Cir.1993). We therefore review the ultimate determination of obviousness without deference to the Board, while examining any factual findings for clear error. *See, e.g., In re Zurko*, 142 F.3d 1447, 1459, 46 USPO2d 1691, 1700 (Fed.Cir.) (en banc), cert. granted, 525 U.S. 961, 119 S.Ct. 401, 142 L.Ed.2d 326 (1998).

A

[2] Our analysis begins in the text of section 103 quoted above, with the phrase "at the time the invention was made." For it is this phrase that guards against entry into the "tempting but forbidden zone of hindsight," *see Loctite Corp. v. Ultraseal Ltd.*, 781 F.2d 861, 873, 228 USPO 90, 98 (Fed.Cir.1985), overruled on other grounds by *999Nobelpharma AB v. Implant Innovations, Inc., 141 F.3d 1059, 46 USPO2d 1097 (Fed.Cir.1998), when analyzing the patentability of claims pursuant to that section. Measuring a claimed invention against the standard established by section 103 requires the oft-difficult but critical step of casting the mind back to the time of invention, to consider the thinking of one of ordinary skill in the art, guided only by the prior art references and the then-accepted wisdom in the field. *See, e.g., W.L. Gore & Assocs., Inc. v. Garlock, Inc.*, 721 F.2d 1540, 1553, 220 USPO 303, 313 (Fed.Cir.1983). Close adherence to this methodology is especially important in the case of less technologically complex inventions, where the very ease with which the invention can be understood may prompt one "to fall victim to the insidious effect of a hindsight syndrome wherein that which only the inventor taught is used against its teacher." *Id.*

[3] Our case law makes clear that the best defense against the subtle but powerful attraction of a hindsight-based obviousness analysis is rigorous application of the requirement for a showing of the teaching or motivation to combine prior art references. See, e.g., C.R. Bard, Inc. v. M3 Sys., Inc., 157 F.3d 1340, 1352, 48 USPQ2d 1225, 1232 (Fed.Cir.1998) (describing "teaching or suggestion or motivation [to combine]" as an "essential evidentiary component of an obviousness holding"); In re Rouffet, 149 F.3d 1350, 1359, 47 USPQ2d 1453, 1459 (Fed.Cir.1998) ("the Board must identify specifically ... the reasons one of ordinary skill in the art would have been motivated to select the references and combine them"); In re Fritch, 972 F.2d 1260, 1265, 23 USPQ2d 1780, 1783 (Fed.Cir.1992) (examiner can satisfy burden of obviousness in light of combination "only by showing some objective teaching [leading to the combination]"); In re Fine, 837 F.2d 1071, 1075, 5 USPQ2d 1596, 1600 (Fed.Cir.1988) (evidence of teaching or suggestion "essential" to avoid hindsight); Ashland Oil, Inc. v. Delta Resins & Refractories, Inc., 776 F.2d 281, 297, 227 USPQ 657, 667 (Fed.Cir.1985) (district court's conclusion of obviousness was error when it "did not elucidate any factual teachings, suggestions or incentives from this prior art that showed the propriety of combination"). See also Graham, 383 U.S. at 18, 86 S.Ct. 684, 15 L.Ed.2d 545, 148 USPQ at 467 ("strict observance" of factual predicates to obviousness conclusion required). Combining prior art references without evidence of such a suggestion, teaching, or motivation simply takes the inventor's disclosure as a blueprint for piecing together the prior art to defeat patentability--the essence of hindsight. See, e.g., Interconnect Planning Corp. v. Feil, 774 F.2d 1132, 1138, 227 USPQ 543, 547 (Fed.Cir.1985) ("The invention must be viewed not with the blueprint drawn by the inventor, but in the state of the art that existed at the time."). In this case, the Board fell into the hindsight trap.

[4][5] We have noted that evidence of a suggestion, teaching, or motivation to combine may flow from the prior art references themselves, the knowledge of one of ordinary skill in the art, or, in some cases, from the nature of the problem to be solved, see Pro-Mold & Tool Co. v. Great Lakes Plastics, Inc., 75 F.3d 1568, 1573, 37 USPQ2d 1626, 1630 (Fed.Cir.1996), Para-Ordnance Mfg. v. SGS Importers

Intern., Inc., 73 F.3d 1085, 1088, 37 USPQ2d 1237, 1240 (Fed.Cir.1995), although "the suggestion more often comes from the teachings of the pertinent references," Rouffet, 149 F.3d at 1355, 47 USPQ2d at 1456. The range of sources available, however, does not diminish the requirement for actual evidence. That is, the showing must be clear and particular. See, e.g., C.R. Bard, 157 F.3d at 1352, 48 USPQ2d at 1232. Broad conclusory statements regarding the teaching of multiple references, standing alone, are not "evidence." E.g., McElmurry v. Arkansas Power & Light Co., 995 F.2d 1576, 1578, 27 USPQ2d 1129, 1131 (Fed.Cir.1993) ("Mere denials and conclusory statements, however, are not sufficient to establish a genuine issue of *1000 material fact."); In re Sichert, 566 F.2d 1154, 1164, 196 USPQ 209, 217 (CCPA 1977) ("The examiner's conclusory statement that the specification does not teach the best mode of using the invention is unaccompanied by evidence or reasoning and is entirely inadequate to support the rejection."). In addition to demonstrating the propriety of an obviousness analysis, particular factual findings regarding the suggestion, teaching, or motivation to combine serve a number of important purposes, including: (1) clear explication of the position adopted by the Examiner and the Board; (2) identification of the factual disputes, if any, between the applicant and the Board; and (3) facilitation of review on appeal. Here, however, the Board did not make particular findings regarding the locus of the suggestion, teaching, or motivation to combine the prior art references.

[6] All the obviousness rejections affirmed by the Board resulted from a combination of prior art references, e.g., the conventional trash or yard bags, and the Holiday and Shapiro publications teaching the construction of decorated paper bags. See Dembiczak, slip op. at 6-7. To justify this combination, the Board simply stated that "the Holiday and Shapiro references would have suggested the application of ... facial indicia to the prior art plastic trash bags." *Id.* at 18-19. However, rather than pointing to specific information in Holiday or Shapiro that suggest the combination with the conventional bags, the Board instead described in detail the similarities between the Holiday and Shapiro references and the claimed invention, noting that one reference or the other--in combination with each other and the conventional

trash bags--described all of the limitations of the pending claims. See *id.* at 18-28. Nowhere does the Board particularly identify any suggestion, teaching, or motivation to combine the children's art references (Holiday and Shapiro) with the conventional trash or lawn bag references, nor does the Board make specific--or even inferential--findings concerning the identification of the relevant art, the level of ordinary skill in the art, the nature of the problem to be solved, or any other factual findings that might serve to support a proper obviousness analysis. See, e.g., *Pro-Mold & Tool*, 75 F.3d at 1573, 37 USPO2d at 1630.

To the contrary, the obviousness analysis in the Board's decision is limited to a discussion of the ways that the multiple prior art references can be combined to read on the claimed invention. For example, the Board finds that the Holiday bag reference depicts a "premanufactured orange" bag material, see *Dembiczak*, slip op. at 21, finds that Shapiro teaches the use of paper bags in various sizes, including "large", see *id.* at 22-23, and concludes that the substitution of orange plastic for the crepe paper of Holiday and the paper bags of Shapiro would be an obvious design choice, see *id.* at 24. Yet this reference-by-reference, limitation-by-limitation analysis fails to demonstrate how the Holiday and Shapiro references teach or suggest their combination with the conventional trash or lawn bags to yield the claimed invention. See *Rouffet*, 149 F.3d at 1357, 47 USPO2d at 1459 (noting Board's failure to explain, when analyzing the prior art, "what specific understanding or technical principle ... would have suggested the combination"). Because we do not discern any finding by the Board that there was a suggestion, teaching, or motivation to combine the prior art references cited against the pending claims, the Board's conclusion of obviousness, as a matter of law, cannot stand. See *C.R. Bard*, 157 F.3d at 1352, 48 USPO2d at 1232; *Rouffet*, 149 F.3d at 1359, 47 USPO2d at 1459; *Fritch*, 972 F.2d at 1265, 23 USPO2d at 1783; *Fine*, 837 F.2d at 1075, 5 USPO2d at 1600; *Ashland Oil*, 776 F.2d at 297, 227 USPO at 667.

B

[7] The Commissioner of Patents and Trademarks ("Commissioner") attempts to justify the Board's decision

on grounds *1001 different from that relied upon by the Board, arguing that one of ordinary skill in the art would have been motivated to combine the references. Of course, in order to do so, the Commissioner must do what the Board did not do below: make specific findings of fact regarding the level of skill in the art ("a designer and manufacturer of trash and leaf bags, particularly one specializing in the ornamental and graphic design of such bags"), Resp't Br. at 14, the relationship between the fields of conventional trash bags and children's crafts, respectively ("[t]he artisan would also have been well aware of the ancillary, corollary, and atypical uses of 'trash' bags such as their application in hobby and art projects"), Resp't Br. at 15, and the particular features of the prior art references that would motivate one of ordinary skill in a particular art to select elements disclosed in references from a wholly different field ("a designer and manufacturer of trash and leaf bags would have recognized the paper bag in Shapiro to be a trash bag and therefore would have been motivated to combine it with the admitted prior art plastic trash and leaf bags to arrive at the claimed invention"), Resp't Br. at 15. The Commissioner also appears to cite additional references in support of his obviousness analysis, noting that at least two design patents (in the record but not cited against the presently pending claims) teach the placement of "graphical information, including text, designs, and even facial indicia, to colored bags." Resp't Br. at 16. This new analysis, apparently cut from whole cloth in view of appeal, does little more than highlight the shortcomings of the decision below, and we decline to consider it. See, e.g., *In re Robertson*, 169 F.3d 743, 746, 49 USPO2d 1949, 1951 (Fed.Cir.1999) ("We decline to consider [the Commissioner's] newly-minted theory as an alternative ground for upholding the agency's decision."); *In re Soni*, 54 F.3d 746, 751, 34 USPO2d 1684, 1688 (Fed.Cir.1995); *In re Hounsfield*, 699 F.2d 1320, 1324, 216 USPO 1045, 1049 (Fed.Cir.1983) (rejecting an "attempt[] by the Commissioner 'to apply a new rationale to support the rejection.' "); see also 35 U.S.C. § 144 (1994) (an appeal to the Federal Circuit "is taken on the record before The Patent and Trademark Office"). Because the Board has not established a prima facie case of obviousness, see *In re Bell*, 991 F.2d 781, 783, 26 USPO2d 1529, 1531 (Fed.Cir.1993) ("The PTO bears the burden of establishing a case of prima facie obviousness."), we therefore reverse the

obviousness rejections, and have no need to address the parties' arguments with respect to secondary factors.

III

[8][9] Dembiczak also asks this court to reverse the Board's rejection of the pending claims for obviousness-type double patenting, which is a judicially-created doctrine that seeks to prevent the applicant from expanding the grant of the patent right beyond the limits prescribed in Title 35. See, e.g., *In re Braat*, 937 F.2d 589, 592, 19 USPQ2d 1289, 1291-92 (Fed.Cir.1991); *In re Longi*, 759 F.2d 887, 892, 225 USPQ 645, 648 (Fed.Cir.1985). See also 35 U.S.C. § 154(a)(2) (Supp.1998) (discussing patent term). The doctrine prohibits claims in a second patent which define "merely an obvious variation" of an invention claimed by the same inventor in an earlier patent. *Braat*, 937 F.2d at 592, 19 USPQ2d at 1292 (quoting *In re Vogel*, 57 C.C.P.A. 920, 422 F.2d 438, 441, 164 USPQ 619, 622 (CCPA 1970)). Thus, unless a claim sought in the later patent is patentably distinct from the claims in an earlier patent, the claim must be rejected. See *In re Goodman*, 11 F.3d 1046, 1052, 29 USPQ2d 2010, 2015 (Fed.Cir.1993); *Vogel*, 422 F.2d at 441, 164 USPQ at 622. This question is one of law, which we review de novo. See *Goodman*, 11 F.3d at 1052, 29 USPQ2d at 2015; *Texas Instruments Inc. v. United States Int'l Trade Comm'n*, 988 F.2d 1165, 1179, 26 USPQ2d 1018, 1029 (Fed.Cir.1993).

*1002 A

[10][11] The law provides that, in some very rare cases, obvious-type double patenting may be found between design and utility patents. See *Carman Indus., Inc. v. Wahl*, 724 F.2d 932, 939-40, 220 USPQ 481, 487 (Fed.Cir.1983) (noting that, while theoretically possible, "[d]ouble patenting is rare in the context of utility versus design patents"); *In re Thorington*, 57 C.C.P.A. 759, 418 F.2d 528, 536-37, 163 USPQ 644, 650 (CCPA 1969) (Double patenting between a design and utility patent is possible "if the features producing the novel aesthetic effect of a design patent or application are the same as those recited in the claims of a utility patent or application as producing a novel structure."); *In re Phelan*, 40 C.C.P.A. 1023, 205 F.2d 183, 98 USPQ 156 (CCPA 1953); *In re Barber*, 81 F.2d 231, 28 USPQ 187 (CCPA 1936); *In re Hargraves*, 53 F.2d 900, 11 USPQ 240 (CCPA 1931). In these cases, a "two-way" test is

applicable. See *Carman*, 724 F.2d at 940, 220 USPQ at 487. Under this test, the obviousness-type double patenting rejection is appropriate only if the claims of the two patents cross-read, meaning that "the test is whether the subject matter of the claims of the patent sought to be invalidated would have been obvious from the subject matter of the claims of the other patent, and vice versa." *Id.*, 724 F.2d 932, 220 USPQ at 487. See also *Braat*, 937 F.2d at 593, 19 USPQ2d at 1292 (explaining two-way test).

B

In making its double patenting rejection, the Board concluded that all but one of the pending claims of Dembiczak's utility application would have been merely an obvious variation of the claims of the earlier-issued design patents--the Dembiczak '023 and '254 references--in light of the Holiday reference. The remaining claim, dependent claim 49, was judged obvious in light of the combination of the Dembiczak design patents, Holiday, and the Kessler reference.

[12][13] Acknowledging that the two-way test was required by *Carman*, 724 F.2d at 940, 220 USPQ at 487, the Board concluded that "the design claimed in each of appellants' design patents does not exclude the features pertaining to the construction and color of the bag, the use of a plastic material for making the bag, the size or thickness of the bag ... or the use of various types of filling material.... The particular details of the facial indicia would have been a matter of design choice as evidenced by the Holiday handbook," and that therefore, in view of Holiday, the claims of the design patents were obvious variants of the pending utility patent claims. See *Dembiczak*, slip op. at 11. We disagree. In order for a design to be unpatentable because of obviousness, there must first be a basic design reference in the prior art, the design characteristics of which are "basically the same as the claimed design." *In re Borden*, 90 F.3d 1570, 1574, 39 USPQ2d 1524, 1526 (Fed.Cir.1996); *In re Rosen*, 673 F.2d 388, 391, 213 USPQ 347, 350 (CCPA 1982). The phrase "having facial indicia thereon" found in the claims of the pending utility application is not a design reference that is "basically the same as the claimed design." *Borden*, 90 F.3d at 1574, 39 USPQ2d at 1526. In fact, it describes precious little with

respect to design characteristics. The Board's suggestion that the design details were simply "a matter of design choice" evinces a misapprehension of the subject matter of design patents. *E.g.*, Carman, 724 F.2d at 939 n. 13, 220 USPO at 486 n. 13 ("Utility patents afford protection for the mechanical structure and function of an invention whereas design patent protection concerns the ornamental or aesthetic features of a design.") Indeed, we note that the two design patents at issue here--the Dembiczak '023 and '254 patents--were considered nonobvious over each other, and were even the subject of a restriction requirement. *See* 35 U.S.C. § 121 (1994) ("If two or more independent and distinct inventions are claimed in one *1003 application, the Commissioner may require the application to be restricted to one of the inventions."); 37 C.F.R. § 1.142. The position adopted by the Board--that a textual description of facial indicia found in the claims of the utility patent application makes obvious the specific designs claimed in the (patentably distinct) Dembiczak design patents--would presumably render obvious, or even anticipate, all design patents where a face was depicted on a bag. But this, of course, is not the law; the textual description cannot be said to be a reference "basically the same as the claimed design," of the design patents at issue here. Borden, 90 F.3d at 1574, 39 USPO2d at 1526 (internal quotation marks omitted). The Board's conclusion of obviousness is incorrect.

Because we find that the Board erred in concluding that the design patents were obvious variants of the pending utility claims, we need not address the other prong of the two-way double patenting test--whether the pending utility claims are obvious variations of the subject matter claimed in the design patents. *See Carman*, 724 F.2d at 939, 220 USPO at 487 (both prongs of the two-way test required for obviousness-type double patenting). The double patenting rejections are reversed.

IV

Because there is no evidence in the record of a suggestion, teaching, or motivation to combine the prior art references asserted against the pending claims, the obviousness rejections are reversed. In addition, because the Board misapprehended the test for obviousness-type double patenting, and because the pending utility claims do not

render obvious the design patents, the double patenting rejections are also reversed.

REVERSED.

175 F.3d 994, 50 U.S.P.Q.2d 1614

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- [98-1498](#) (Docket) (Jul. 14, 1998)

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